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MICROBES AND MEN

BY ROBERT T. MORRIS M.D.

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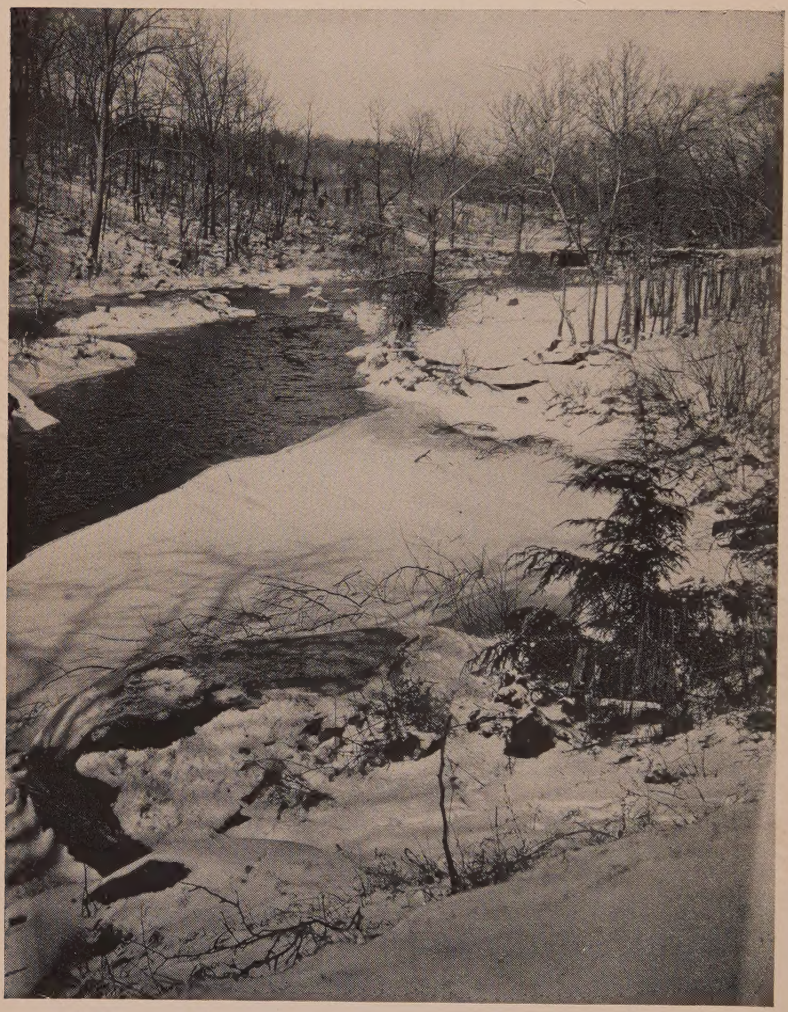
MICROBES AND MEN

TO-MORROW'S TOPICS SERIES

MICROBES AND MEN

A SURGEON'S PHILOSOPHY

DOCTORS VERSUS FOLKS



"Odd folks belonging to some strange new nation will come and sit upon the rock at the foot of my garden two thousand years from next June."

MICROBES AND MEN

To-Morrow's Topics Series

BY
ROBERT T. MORRIS, M.D.

Illustrated

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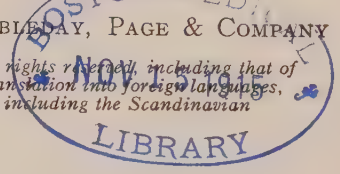

DEDICATION

Dedicated to the memory of my dear old chum, Francis E. Dwight.

We first met on the hard board seats of the College of Physicians and Surgeons at the corner of Twenty-third Street and Fourth Avenue one autumn day in the year of 1881. I had volunteered some information to a stranger on the left in my usual cock-sure way, and he promptly transfixed the idea with a point of wit so deftly that the advantage of securing him for a companion was obvious.

He adopted the suggestion largely upon a ground of sharing economies in room rent no doubt, and joined me at number Sixteen East Thirty-second Street. Here was the board of gracious and dignified Mrs. Townsend, whose previous experience as matron at Sing Sing Prison had qualified her particularly well for managing a boarding house in New York.

Frank and I had few traits in common. He was a refined scholar with a handsome intellectual face, while I was an athletic blunderbuss, but we both found youthful joy in discussing complicated hypotheses, and both had arrived at a point in self-culture where nothing could make either one of us angry.

Frank following his family traditions had taken a classical course in the arts at Hamilton College, while I had run away

from family traditions of Yale, in order to study natural history at Cornell under Professor Wilder (who did not always approve of me in science).

At our end of the dinner table in New York sat a young teacher, as clever as any clever woman can be, with a current of intuition which began to sparkle and snap whenever any sort of subject was brought near.

There was also at our end of the table a much beloved Englishman, a bachelor of sixty whom we called Jeff. In him respectability had been visualized. He possessed a fine religious instinct and sense of justice and right, which prevented him from laughing upon any basis of intuition until mature deliberation convinced him that he understood. The discussions between Frank and myself on speculative questions interfered with his peace of mind, and once when we were absent the teacher was asked if Frank and I were to be taken seriously,—to which she replied, "Why, that all depends upon yourself, Mr. Jeff!"

In these pages are subjects of the sort that Frank and I loved to discuss, but now I am writing alone. Others must take his part, with that broad and catholic grasp which Frank would have taken in agreement with or refutation of my propositions.

PREFACE TO SERIES

In olden times, prefaces were addressed to "the gentle reader," and no doubt expressed the hope that he would remain so until the end of the book. These notes represent the views of just one spectator in the world, who has managed to be comfortably useful, comfortably successful, comfortably happy, and who looks forward to an enjoyable old age.

It has been necessary to throw ideas together into a sort of loose general grouping, because the only time for writing has been during summer vacation on the farm. The path will lead over some cliffs presenting outlook, and through loose rocks and small sand. Sequence and unity could not be arranged very well, because of the influence of many conflicting kinds of daily responsibilities. The structure of all three books then is of the "Oh, that reminds me!" sort, and adapted for fragmentary reading. One may open the pages at almost any point and find something to which he will object. When a writer knows how to make a book, but has no time for doing it just as he likes, the discomfort is something like that of a man under the influence of curare, which paralyzes the motor nerves while leaving those of sensation unaffected.

The original draft of notes was intended for physicians, who constituted the audience when my paper which furnished the basis for building was first read. Elaboration of points followed a line of least resistance into the field of lay interest,

and as the general reader will not care for the medical part, it is published separately as the third book of the series. The first book, "Microbes and Men," may appeal particularly to readers who are fond of ultra science, and the second book, "A Surgeon's Philosophy," treats questions of the day with a lighter touch.

The books aim at a large interpretation of the meaning of life. They call before the footlights, in front of the curtain, that playwright of all our affairs,—the microbe.

Biology teaches that the determining factors in all lives belong to heredity and environment, but overlooks the fact brought out in these notes, that heredity and environment are dominated by the microbe. We became conscious of a step in progress when we were instructed not to look at men directly, but through the lenses of heredity and environment. These notes compound the microscope. They oblige us to focus through the lens of the microbe, when adjusting heredity and environment for purposes of obtaining a clear view of mankind.

We are not far enough along with our knowledge of the chemistry of metabolism to describe concretely the influence of microbic toxins in our every-day affairs. Men who know most about the subject are the ones who are most afraid to speak at this moment of rapidly changing knowledge. Such commendable caution belongs to the accurately scientific mind, but it is time right now for some sort of an angel to fly in where prudent men fear to tread. This idea gives me "as large a charter as the wind."

The description of all mental and physical activities in man as being dependent upon the microbe, rests upon a basis of fact which is known to a few men. Nature does not wish the public to become aware of that fact; otherwise, her great secrets would be out too soon. A motto of the Boy Scouts

is "One good turn a day." If we think of one microbe action a day for 365 days, at the end of that time we shall be well on the way toward simplification of all human problems, and most of the mysteries.

The term "microbe" is used in accordance with the old definition from the derivation of the word, and includes all microscopic guests, bacterial, infusorial, or protozoan. When referring to microbes of the alimentary tract it is convenient to speak definitely of one group chiefly,—the colon group—because an elaboration which would be required by a truly scientific writer might divert attention from the main points at issue.

The word "toxin" is employed colloquially. The chemical nucleus of a bacterium does not become a poison until it is set free. This protein poison is therefore different in character from the toxin proper which is secreted or excreted by a bacterium. Technical elaboration of the subject is avoided and our purposes served by referring to toxic influence in the ordinary acceptance of the meaning of that term.

The expression "sensitization of protoplasm" is employed as referring to toxic over-sensitization, because normal processes are really carried on under normal sensitization of protoplasm, by organic stimuli.

The term "decadence" lacks pleasing cadence; consequently it has seemed best to use by synecdoche the expression of the doubling rose. This actual parallel to degeneration in man represents a part which may stand for the whole without causing offence, because it includes the idea of great beauty along with the idea of decline of physical powers.

Some of the ideas and characters must be employed repetitiously at various points in the text in connection with different perspectives, and I would ask to have the reasons for this repetition taken into consideration.

It has been necessary to allow highly speculative theories, accepted facts, and tenable hypotheses to run along side by side in mixed company. Each reader then may exercise his own judgment in selecting what appeals to him out of his personal experience. I would not ask anyone to agree with me, for when men smile and agree progress weeps.

There is a message in the books—several, in fact. Kindness is lifted out of the kindergarten where it has been a plaything at the caprice of all other emotions, and it is transferred to a place of usefulness for mature people who wish to be kind intelligently rather than emotionally. One foundation block is contributed toward a scientific basis for criticism in art and literature. We are asked not to look for mystery in destiny, when past history and present signs give such clear reading. Questions of the day are placed upon their biologic bases.

When assembling these notes, my intention has been to quote as little as possible from other authors so far as conclusions were concerned, but I have freely laid hand upon lines thrown out to me by other authors. One is never quite sure, after thinking over an idea, that it has not been borrowed. The better the idea the more I feel that it must have come from somebody else. One of my poor neighbors at Newtown, with a large family of children, was very much distressed over the loss of a boy. I tried to console him by saying there were seven left. He replied, "Yes! yes! but this was the best one. I wa'nt never sartain the boy was mine, but he was the smartest one of the hull lot."

The following course of reading relating to the first book of the series, is suggested: 1. The Man of Genius, by Lombroso. 2. Degeneration, by Max Nordau. 3. Old Age Deferred, by Lorand. 4. Jordan's General Bacteriology. 5. A Series of articles appearing in the *New York Medical Record,* by Dr. Eccles, between May 9, 1908 and March 16, 1912.

6. Heredity and Eugenics (The University of Chicago Press Edition), by Coulter, Castle, East, Tower and Davenport. The works of all these authors may be obtained from any book dealer, or at any large public library, with the exception of the Eccles articles, which will be found in medical libraries.

616 Madison Avenue, New York.

August 1st, 1914.

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MICROBES AND MEN

TO-MORROW'S TOPICS

CHAPTER I

Schopenhauer says that life is a great mistake, and he proves it. Sir John Lubbock says that life is a beautiful gift, and he proves it. Tennyson says that nothing worthy being proven can be proven, nor yet disproven, and he tells us under the circumstances to choose the sunnier side of doubt.

The three propositions lead us to assume that men are free to choose their own thoughts, but this is not true. Nothing is true, excepting in a relative way.

Man is the only animal persistently engaged in bringing about his own destruction. He does this with what he calls his intelligence, through becoming barren under conditions of culture, and through warfare upon his brother man.

Man is the only animal capable of developing a philosophy which can make him unhappy. This he also does with what he calls a higher function of the intellect.

Have these tendencies toward unhappiness and toward race destruction no meaning?

They belong to large plans on the part of nature. Nature is trying out certain races, one after another, in order to eliminate the ones which are incapable of development beyond certain points. This is done through an agent of sublime power,—the microbe, which attacks the cells of which all men and all organic structures are composed.

Protoplasm is the basic unit of organic life. Microbes and

body cells of higher organisms represent protoplasmic bodies which are simple morphologically but highly organized chemically. In the course of evolution they have come to be the peers of each other as a result of the struggle for survival. Incidental phenomena consequent upon the struggle between microbe and body cell in man may be observed in such widely differing kinds of demonstration as a case of typhoid fever, a political misunderstanding, and the composition of a poem, all of which processes are akin to each other in the sense of representing physical effects of by-products of the chemical fight between microbe and body cell in the highest organism—man.

A simple object lesson of the cell versus microbe contest may be observed in the orange. Strip off the thin covering from a segment of orange. Note the bundles of large fusiform cells. These are among the largest simple cells in the whole organic world, and easily seen. The thick skin which was pulled off in order to expose the large cells is also composed of quite as orderly groups of cells, but too small to be seen with the naked eye. The fragrant outer skin of the orange, its seeds, and the branch from which it hung are in the same way composed of orderly groups of cells. A man's body is like the orange, each tissue made up of its own kind and size of cells.

If the large simple orange cells are squeezed and their juice pressed out, opportunity is given to a kind of microbe which will feed upon the juice, and which will transform it into a sort of wine, with pleasant odor and flavor. If the orange is allowed to stand without any squeezing, another kind of microbe will come along presently, and beginning to feed upon the smaller celled parts, will give the unpleasant odor and flavor of putrefaction. The bodies of all animals and plants are composed of groups of cells, as in the orange.

These cells are all exposed to microbic attack, as in the orange. The kind of microbe which takes charge of the attack produces its own characteristic effect, as in the orange. A normal man is normally agreeable, as is the unspoiled orange. He may be unusually agreeable, or unusually disagreeable, for the same reason that the orange is agreeable or disagreeable at various stages or kinds of stages in its history.

Incidentally the microbe causes practically all of the unhappiness in this world, and the depressing philosophers are found, on reading their life histories, to have been ill men,—every one of them. A man is only what his microbes make him. With a normal proportion of symbiotic bacteria he is the good citizen; with an excess of inimical bacteria he may become what I call the criminal essayist or novelist. When he speaks, it is not he, but the microbe, that is speaking. Freedom of the will is subject to dictation by the microbe.

If a man's physiology is maintained at normal levels, the microbe conducts metabolism for him in such a way that he quotes the microbe normally. When physiology is depraved, as commonly occurs with the genius and with the criminal, he quotes the microbe abnormally.

The microbe is the keystone of the arch of all organic life. No plant or animal can live excepting through the agency of the microbe,—not for a single hour.

When culture hastens the development of a man or of a plant, it favors at the same moment, synchronously, development of microbes, some which are essential for life, and an opposing group which is inimical.

In a low form of life found among the amoebae, one set of cells serves for purposes of both sex and nutrition. A step higher, we find *volvox* with two sets of cells. The inner protected set is the sex group, but a part of the cells have now formed an outer protecting layer against microbic invasion

of the essential sex cells. These are the soma cells, and their sex value is lost. As animals and plants ascend in the scale of development, the soma cells increase in proportion, while the sex cells, better and better protected, form a relatively small part of the organism. The higher animal or plant is simply a great city of cells, mostly soma cells.

A cell consists essentially of protoplasm with a nucleus, and the physical basis for heredity is carried within the chromosomes of the nucleus.

A flower beginning to double may not pass that particular acquired characteristic along to its progeny in an hereditary way, but it may entail to progeny certain characteristics which allow their protoplasm to become sensitized in the same way as that of a parent under the influence of the same microbic toxin. This might lead sex plasm to be expended by mutation in soma plasm effects. We would in that case be dealing with variation,—but variation under the influence of toxic stimulus.

Flowers of some species of plants lose their breeding ability altogether when doubling, so I choose the rose as representing man, because the rose commonly maintains more or less breeding efficiency even when doubled. A coarse plant like the Golden Glow *(Rudbeckia)* loses all of the staminate parts of the flower early when doubling.

I would avoid the idea of calling names when using the term "decadent," because we have all been so crossed on account of our happy-go-lucky system that it would be a glass house affair, and difficult indeed to find any one who did not have some of the physical signs of decadence. Take the tooth formula for instance. The tooth formula is very important in classifying species of animals in zoology. How far would a naturalist have to go before finding a perfect set of teeth among men in case he wished to classify us from our tooth formula? Aside from abnormal forms and arrange-

ment of teeth, how many of our teeth are there which successfully defy microbic invasion of their own structure? It is hardly calling names to speak of "decadence," in a situation in which we are dealing only with a matter or degree. Almost no civilized man would escape from that classification. Nevertheless, I prefer to employ the prettier term of "doubling rose" for expressing a meaning of advanced features of decline.

Some members of the *rosaceæ* which are much crossed—cherry, almond, plum—are apt to lose their stamens completely when their flowers double.

When the gardener has found a double cherry or almond flower he knows that breeding has ceased or nearly ceased for that tree.

The doubling rose, however, is often capable of making sufficient pollen until the very last stage of this feature of decline has appeared in any one family group.

The body cells conduct all physiological processes, but they are in constant warfare with the microbe. When microbes or microbe poisons reach the cells, a destructive process follows. Perhaps the most important of these destructive changes is represented in what we call allergy. Allergy refers to a certain general kind of toxic sensitization of protoplasm. Another term, "anaphylaxis," has been used to describe sensitization by the toxin of a specific microbe, but at the present writing both terms are being used synonymously. This being the case, it may be well, in order to avoid confusion, to drop the word anaphylaxis, which was used by Richet, meaning "without protection." We now know that this is a misnomer. The term "allergy" (allos, ergon) which was first used by von Pirquet, will suffice to stand for sensitization. A new word of Greek derivation would be desirable, because of the technical application of our meaning in the field of pathology.

The injury represented in allergy consists in sensitization of cell protoplasm in such a way that it acts abnormally.

A child's description of allergic sensitization would be this. There are three physical entities in the world; matter, energy and the ether. (Matter and energy are held to be physical entities, for purposes of our convenience.) Energy and the ether combine in the form of elements, and each element then forms habits of its own. Let us assume that all matter is constructed from the element helium. Helium has the habit of building in squares of four, or multiples of four, still assisted by one parent,—energy, and directed by its other parent, the ether.

Cell protoplasm being a kind of matter is built up with four-sided blocks, the groups of four blocks resting nicely upon each other's margins. Pour a little sand upon the structure that is being thus built up, and the sand gets between points of contact of the blocks, and makes them unstable and sensitive to vibrations. The sand is toxin poured in by mischievous microbes. Set the blocks to vibrating by pouring on more sand carelessly, and they tumble into abnormal positions (shown in fever, pain, hallucinations), and an effort is required to get them back into order again. Now, in order to bring about a remedy of this situation, we either remove the source of the sand or we add a tiny trifle of sand carefully, not enough or frequently enough to set vibrations going violently. The sand then quietly fills all interstices in the structure in such a way that it becomes part of the structure (metabolized toxin) and may actually help to support the four-sided helium blocks in their groups-of-four construction.

We may speak of normal animal metabolism as homergy. Homergy (Homos, ergon) relates to customary animal cell work, while allergy relates to the work of introduced influences which are foreign to normal cell work.

Until the advent of Bose, with his electro-physiological experiments, plant physiologists had not taken up the study of protoplasmic phenomena along the lines which had already given such high development of our knowledge of animal physiology. We now know that the relation between stimulus and response forms a gauge of the physiological condition of the plant organism. It is only very recently that we could assume that an over-cultivated rose would become nervous and excitable for the same reason that an over-cultivated animal becomes nervous and excitable.

The behavior of a plant or of an animal then may depend upon the degree of microbe influence upon its four-block helium system of cell protoplasm. Good microbes lend a hand in assisting energy in its task with helium of building up plants and animals. Bad microbes interfere. Both kinds are always present, incessantly taking part in construction or demolition of protoplasm. When the gardener cultivates ground, he wishes to assist his plants through the agency of good microbes which develop as a result of his efforts. That is all that cultivation means. The gardener overlooks the fact that his efforts at the same time favor increase of bad microbes, and heighten the effort of the plant to resist their activities.

If bad microbes throw sand between the helium blocks of protoplasm of sex cells of a plant, the blocks become disarranged in such a way that some of the sex cells lose their function, and act as soma cells. The flower has then doubled, as we say. In other words, the flower has become more beautiful, because stamens are transformed into pretty petals, but it means just that degree of corresponding loss of sex cells. When cultivation has finally carried a certain plant to the point where its stamens have all gone to form petals, it has no more good sex cells left for continuing its race. A similar process occurs among animals. In addition, the pro-

toplasm of any species is wound up by nature, and given a certain time to run, before becoming senescent. Senescence of protoplasm is hastened by processes incidental to cultivation. The logical end of culture then is elimination of the race among plants and among animals.

A double rose among plants, and a genius among men, represent the same thing.

Some doubling flowers possess great physical vigor, however, and carry a sufficient number of sex cells,—the American beauty rose for instance.

Some geniuses possess great physical vigor, and are enabled to have strong progeny. Henri Poincaré for instance.

Not all plants of a family begin to double at the same time, when subjected to similar conditions.

The double rose and the genius, however, have entered the sensitive vulnerable group in which an excessive degree of care is required for maintaining their equilibrium as organisms.

Most of the plants with double flowers are so vulnerable to microbic influences that they readily succumb or produce freaks in progeny, if they have any. Most of the geniuses are so vulnerable to microbic influences that they succumb easily, or produce freaks in progeny, if they have any. A double rose may have progeny which, if left to struggle, will either fail quickly, or will revert to a simple type. The progeny of a genius when left to struggle will quickly succumb or will have a tendency to revert toward a primitive type of man.

The progeny of a double flower, or of a genius, then will have to start off again under conditions of competition. This may allow the development finally, in later generations, of more doubling flowers or of more geniuses.

In this way nature sets limitations, prohibiting too rapid

development of species of plants or of animals, in order to conserve the protoplasm of a species against premature senescence.

Nature makes progress through development steadily of the mean type,—and proper aid on the part of man consists in making selection of the best mean types for purposes of propagation. The double rose crossed with another double rose does not altogether please nature, and she finally pulls the whole lot of progeny to pieces,—if any progeny is allowed.

If we ask why nature has such definite plans, the answer lies with infinity,—out of our reach. We are only allowed to note the object lesson of the oak tree. Nature wishes the oak tree in her landscape plans. If a fine oak is wanted in the landscape plans, why is it not allowed to grow to a height of eighty feet in one day, and save time? That would be the business man's way of doing things.

Nature says: "Ha! ha! This is my game, not yours. I want other things to grow also. The oak must struggle with its competitors when it is little, and with microbes all of the time. If it has patience and good nature, and at the same time is a successful fighter, it is one of the things I want. If it cannot win, I don't want it, because I am playing a game which in the end will consist of winning players only. I allow men to vainly think the world is theirs in order to give them that degree of encouraging personal interest which will keep them playing at my game."

Nothing that men say is true excepting in a relative way—even in mathematics. The mere statement that three angles of a triangle equal two right angles is not complete. We have to specify that we are speaking of an abstract plane triangle, and the mere mathematic statement that three angles of a triangle equal two right angles may be misleading, simply

because we habitually think ordinarily of abstract plane triangles. For instance make an abstract plane triangle of railroad track extending between three towns. It then conforms to the curvature of the earth, which is spherical, and we leave the question of plane geometry and enter spherical geometry at once. In high mathematics we go into the spherical triangles, the mathematics of which in relation to the earth must run into infinity like every other question on earth.

Now the triangle question is still further complicated. Even the two right angles contained in the abstract plane triangle which we have in mind are according to Euclid's geometry only. According to Lobatchewsky, the three interior angles of a triangle are less than two right angles, and according to Reimann they are greater than two right angles, and these differences increase with the area of the triangle. It would seem as if we might determine which geometry is true by measuring the angles of a large triangle, formed by the diameter of the earth's orbit and the lines joined at its extreme points to a fixed star, but in making such measurement we would have to assume that light is propagated in straight lines, and if we found that the sum of the measured angles was not equal to two right angles we should not change our geometry; we should simply conclude that light is not propagated in straight lines. We should make that conclusion because it would be more convenient to do so. Geometric theorems are necessary consequences of the preliminary hypotheses, and these latter are merely arbitrary. We choose them because they are the most convenient, in other words, poetical. If mathematical calculations then must be classed as poetical in their nature, we are left quite free to give whatever poetical construction we wish to all phenomena relating to this earth, although we have to halt at time and space because time and space relate to infinity, and are not for our comprehension,

not even for poetical conception. The metaphysician leaps at his artificial time and space very much as a salmon leaps at an artificial fly and with similar results. The adult salmon leaps at a fly presumably because a certain centre of his parr brain carries memory of floating flies into his adult life. The metaphysician leaps at a predication of Antecedent Mind because his memory centres carry impressions which have been made by matter, and from this basis, intentions which we understand persist.

Mathematicians devoted a considerable degree of attention to questions of the flying machine before it was really developed, and while mathematical science was then as perfect as now, the final result of their efforts was to prove that a bird could not fly.

In the accepted electron theory of matter, even Newton's third law asserting the quality of action and reaction obliges us to assume something. We have to assume a reaction on the ether which gives the necessary compensation. Newton's third law then is poetical in its nature.

Metaphysics is a bower of safety in the garden of a fool's paradise. If men can run to such a bower whenever they encounter difficulties, there is lack of incentive to face genuine scientific labor bravely. A bower which gives protection is often chosen, instead of a steed which carries one to the winning front of battle.

It is interesting to note the tribute which metaphysicians unconsciously pay to Science. Bergson, in his presidential address before the Society for Psychical Research, tried to explain why Science looks askance at psychical research. He said that the average man had been bred to a mental diet of provable facts. Experiment and measure had been his science; but phenomena of the mind were not measurable. There was a tendency to confusion in considering mind and

brain as interchangeable terms, but this was metaphysical hypothesis, which facts fail to prove. When the scientist examined "psychics" he found that it did not square with his mind-brain equation, and he therefore considered the whole thing as illusory. How about Bergson proving his own equations? Equations run to infinity anyway, and are simply used upon one side or the other side of any question according to a man's convenience. Bergson said that around the perceptions of the organs of our senses there existed a fringe of vague perceptions capable of becoming more distinct in abnormal cases, and these were the ones from which psychics were to obtain testimony of value. Please observe now that Bergson's hypothesis has the same defect as a mind-brain hypothesis (speculative, not proven by facts). Science is not ready to admit that valuable testimony is to be obtained by psychics from vague perceptions in abnormal cases. Such an hypothesis would provoke considerable debate. Bergson said that if the apparition of a dying person to a friend was a real fact the phenomenon was subject to laws and we should be able to reproduce it experimentally if we knew its conditions. Here then appears Science in Bergson's words, "Study conditions and devise methods for proving claims in an ordinary scientific way." No metaphysics about that! Incidentally we might remark that science can reproduce an apparition experimentally. Give morphine enough to an individual whose thoughts are strongly upon other individuals and these other individuals will occasionally appear in apparition form. Science then claims that the apparition is a manifestation of morbid activity of certain clusters of physical brain cells. Science would look for the impelling toxin, not for the apparition. Apparitions have been able to look out for themselves,—never capturable.

Metaphysics assumes that it is safe when it depends upon

logic. We must not forget that one may sometimes get a right conclusion out of faulty premises if his logic is bad enough; but good logic on the same premises would lead him far astray. If people already know their premises to be true, logic seems a superfluity, because people then know already the truth of their conclusions. The methods of logic are not so important as its science, for it really teaches all of the other sciences how to work. It must always be the mentor for other sciences, although it is no better than they in the respect that it cannot be kept within the ropes of the finite. Metaphysics makes a cross team with logic, because logic takes no risks while metaphysics does little else but take risks. They are alike in some ways. Both appeal to the dogmatic, and their assumptions are for the purpose of entrenching the position of the individual metaphysician or logician. Both try to separate the intellect from the emotions, and logic is contentious about allowing any emotions to interfere with the intellect. It says, like Omar in the presence of the Alexandrian library, "If the books do not agree with the Koran, they should be burned. If they do agree with the Koran, they are unnecessary." Logic would burn those expressions of emotion which are illogical, but upon which religion, poetry, and fiction have placed great dependence.

We seldom think of the poetic side of formal logic, but in order to develop a system of reasoning, exact in its processes of theory, reasoning has to be chosen from somewhere and coordinated by somebody, who thereby makes himself responsible for the syllogism. This he cannot do unless he imagines it to be relating to some purpose he is realizing. In this feature of the logician we have a parallel to the imagination of the mathematician. Poetic significance appears in the personal origin and ending of the syllogism, which runs away toward infinity when too many questions are asked by simple

people, who fail to realize the gravity of the situation. Recapture of the syllogism then may require the exercise of an exalted degree of imagination.

In showing that logic and mathematics are poetic in their nature,—dependent upon assumptions,—there is no display of a spirit of iconoclasm. The intention is exactly the opposite and I would simply overturn our institutions very gently and cautiously, as a father would turn over a stone in the field in order to show the children what was beneath it. One may tip over institutions just far enough to show the microbe and infinity beneath them all, and then cautiously replace them in good order for the time being. Each one of our institutions, good or bad, is a cog in the wheel of nature's machinery, and nature loses time whenever a meddlesome human workman breaks a single cog suddenly. We must destroy neither the saloon nor the church, nor politician nor priest,—neither the gambler nor the missionary. Each one is bad and each one is good. Our duty is to so adjust the cogs that they fit a little better every year. Reformers are apt to get spilled out of society, because an *ergo* is a sort of canoe, which is valuable for carrying one if he keeps his balance well in the centre of gravity. If an iconoclast who would change our institutions leaps upon one or the other end of any *ergo,* he is apt to be spilled out so quickly that his usefulness ceases.

The idea of showing that mathematics and logic are dependent upon assumption, is for the purpose of descending from above with a fresh movement of clear new air which will allow us to perceive that French novelist or German philosopher may be thrown away whenever we please to treat them in that way. Men have not seen their way to do that. They have felt that genius must be recognized and that it must necessarily have basis in value; whereas, the wonderful touches of genius are often in fact nothing more than

chameleon colors induced by the microbe. If we can show that mathematics and logic run to infinity, we may then constructively decide that no philosophy is finite. To that extent the mind is freed from that bondage which is so often accepted by the young and trusting.

No question can be settled completely, because all questions run to a sort of loose end. Consequently everything in this world is relatively right or relatively wrong, with nothing but infinity at either end of what man is allowed to comprehend. He can deal only with the three physical entities (ether, energy, matter) in their relations to us, and it is allowed us to play the part in nature's game with these three cards only. Even with these three entities, nature chose to make the game a game of three card monte, leading people astray when they are most sure they are right. Under no circumstances does nature allow us more than the three cards, and if we try to introduce infinity, a fourth card, as a scientific or theological joker, it only leads us still further astray. Stick then to the three cards and the known principles of the three card monte game.

Like children who are not permitted to do certain things, we are not permitted by nature to think in terms of infinity. We may think in terms of the universe, transcendent minds do that. We may think in terms of the world, the noble mind finds itself so engaged. One may think in terms of his country, a great mind does that. It is fine to think in terms of the state, commendable to think in terms of the town, and one may think in terms of himself if that is his best outlook, but we are not allowed by nature to think in terms of the finite.

For purposes of comfort, I like to think in terms of the following formula. Mind as first cause, directs all things on earth. We may perceive that a first cause exists, but we cannot bring it to a focal point for observation, because it

comes out of infinity with parallel unbending rays. The ether, however, is something definite to our minds, because it carries vibrations, and vibrations can be focussed by comprehension. Beginning then from the known ether we can imagine a construction of matter plus energy. From matter plus energy we obtain the inorganic plus the organic. From the inorganic plus the organic we get body action plus mind action. Now if we begin to abstract and remove body action and mind action, we still have organic matter left. Subtract inorganic matter and we have energy left. Subtract energy and we have the ether. Last of all subtract the ether and we still have mind left, but in the parallel rays of infinity, out of focal range. Graphically we can put it in this formula. A space shaded with parallel lines labeled "mind," and within this space we place the following formula:

	Matter		Inorganic matter		Body action
The Ether forms	plus	forms	plus	allows	plus
	Energy		Organic matter		Mind action

But

Body action		Inorganic matter
minus	=	plus
Mind action		Energy

Inorganic matter		
minus	=	The Ether.
Energy		

I cannot imagine a beginning of mind, but can imagine the ether as beginning somewhere in mind, and allowing the construction of some such formula as this one.

We can make a working formula for describing man in order to make use of him in our cosmic problem. His body we say is made up of helium or multiples of helium. His body then is represented by He_4. His mind is apparently made up of Vanity or multiples of Vanity, to which we give

the symbol VY. His soul, which we assume from our present knowledge to exist, we may call a free form of ether like the extra molecule of oxygen in ozone, and is represented by Et3. My simple formula then for introducing man into cosmic equations would read:

$$He4+VY+Et3 = \textit{Homo sapiens.}$$

This is not for the purpose of solving *Homo sapiens* but for the purpose of placing him in other problems just as we would use a formula in calculus.

The terms spiritual and material are after all nothing more than conveniences of nomenclature, useful for the purpose of stating terms for metaphysical argument. The theory that the mind, extending with movement of matter, has a changeless structure in space, simply brings one to a question of definition of mind and its differentiation from the ether. The monistic unity idea admits that the ether has changeless structure, but has changeable form;—sometimes mind,—sometimes matter. Confusion in argument would result only from confusing the terms structure and form, and we may call the theory of changeless structure of ether, material or spiritual, as we choose. We may call the theory of the changing form of ether material or spiritual, as we choose. The monistic unity idea, starting from the ether, simplifies the argument wonderfully, and leaves us only with a question of origin of the ether. This question, however, belongs to infinity, and we are not allowed to use it for a plaything on this earth as yet, according to nature's plan.

My first comfort relating to the question of mind and matter was found in Kant and in Hegel, who broke down the old dualism, and conceived of an organic union between mind and matter. In their day, the third physical entity of ether was not a factor in problems.

If that within us which aspires is really the mind within

the mind, we may still be dealing with matter in another form of expression.

It was formerly held that there were only two physical entities in the world, but now we know about the ether, and consider matter and energy to be entities as a matter of convenience only. It may take the place of the idea of some of the older philosophies to the effect that thought was the third entity which ruled and directed the others, but even thought may be a demonstration of ether, liberated from potential in our food, as light is liberated from coal. A convenient working hypothesis for thought would make it something similar to the X-ray, not atomic but a response to atomic impression made by brain cells upon the ether. The mind may be a special form of energy, intended by nature to be liberated for the purpose of giving direction.

If matter consists of helium combinations and if helium combinations are like all other effects of the ether,—changeable—we may assume that matter is destructible as such, and that it appears in the form of matter only as a helium incident of expediency, serving at one time as matter and at other times appearing as cohesive energy, or in some other ether function, becoming ether again from time to time.

Matter occupies space and possesses weight; a silver dollar, for instance. Light, heat, electricity and magnetism, so far as we know, occupy space but do not have weight. Qualities of the mind, like mercy, may be like light in occupying space, but they are not measurable, although mercy as a product of the mind may be like light. All date back to ether, and make actual physical relationship between light and the soul. If light can occupy space without being classed as matter, why not the soul? The influence of imponderable things may be observed. We can prove the presence of ether. For instance if we place the radiometer with its little mill-wheel

in the sun we note that the wheel begins to revolve with great rapidity. An energy which has come ninety-three million miles from the sun is turning the wheel around. We speak of this as waves of energy, and a wave, as we understand it, must inhere in something. We know the coarser parallel of waves of water, the still more delicate one of waves of air, so we can understand about waves of ether, and know that between us and the sun there is something carrying waves. Wherever light goes, something must carry it. There are no empty spaces, the whole universe is full, no empty spaces anywhere. Not only space so-called but also the solid parts of the world are permeated by this same ether. No one knows how much of our tissues are matter so-called, and how much consists of ether, or what proportion is ether in that form which we call matter.

Energy constantly changes the state of motion in all bodies. Nothing in the world is at rest. Matter occurs in different forms, and so does energy. Just as we have different kinds of matter in the elements, so we have energy of gravitation, energy of heat and electricity, energy of cohesion, chemical energy, radiant energy. Energy may be converted from one form to another, and we can transport it and transform it. Matter is destructible and may be sent back into its three original components,—helium, energy and ether, but energy is indestructible, so far as we now know, although it may appear in matter, or change its form back to ether. We can play with matter and with energy, but that is all. We can assume if we wish, that matter, energy, and ether may be only three forms of one thing,—the ether. Nature does not wish us to know at present.

We had always believed the elements to be unchangeable, until radium and thorium were discovered. Now we know that some elements can change, and thorium is one of the

most marked examples, changing its nature without external influence several times, undergoing four recorded kinds of change in the course of a few years.

Perhaps in radium we see nothing more than an incident in a progressive series of universal transmutations, every element changing into another, passing through the entire series from heavy to light. The system of elements as at present known arranges itself chiefly into two series, whose chief terms are separated from each other by four units or a multiple of four. The beginning of the series is helium with an atomic weight of four. The helium atom then would seem to be the fundamental one, constituting essentially the structure of all things that we call substances.

The merry little dancing sub-atoms living in a molecule of hydrogen must gaze in wonder up to the great round distant molecules very much as we look up to our planets. In a comparative way in relation to the vastness of space and of laws the sub-atoms are about as important as are the living beings on this earth.

The earth with all of its puffed up little folks hurrying hither and thither with their affairs is nothing but a molecule in the heavens. For a couple of eons or so it has found conditions right for proceeding with the development of its forces in the form of plants and animals, of metals and crystals, and all that sort of thing. After a while, the earth will tire of its job, it will become drowsy, the plants will use up all of the water and store it entirely away in the form of insoluble carbon compounds,—all ship-shape for the long night. Then the world will sleep, on, and on, and on, swinging and whirling along through millions of ages fast asleep. Nothing but a collision with some heavenly body will suffice to awaken its forces; but in that case its forces may start off into action again.

"That final impression of continuity which could make a cosmic theory include the idea of this world being only a complex molecule in a flowing mass . . . the space between heavenly bodies representing nothing more than porosity."

All matter consists of molecules with their atoms and lively sub-atoms. All matter has porosity, or spaces between its molecules. Perhaps this earth is merely one little molecule of some stupendous mass; its active organic life may be looked upon as sub-atomic by Antecedent Mind; the spaces between heavenly bodies may represent nothing more than porosity of some kind of mass. This world would not be a simple molecule in some solid mass, because that would be opposed to our ideas of physics, but it may represent a sort of complex molecule which is a state above the simple molecule with its atoms and sub-atoms. In this step in advance, a mass like our earth with its organic and inorganic life may constitute a complex molecule in some greater mass, and this whole mass may be round and forming but another molecule in a still larger mass.

While the spaces in the heavens between stars may represent nothing more than the porosity of some stupendous mass, the recent discovery of star streams would seem to indicate that the mass is fluid as we understand fluidity, rather than solid as we understand solidity. The star streams intermingle like smoke of two locomotives passing in opposite directions; each cloud of smoke has its respective movement. When the two clouds intermingle, particles of carbon in one may be moving in quite an opposite direction from particles of carbon in the other. Particles of carbon in these two clouds of smoke represent the stars of the star streams. There are eddies and side currents of stars following the same laws as eddies and side currents of molecules of water from two different brooks which run singing together to form a bolder stream of water. A certain degree of movement of molecules takes place in some bodies that we call solid, and some of the kinetic energy of such moving molecules is theoretically measurable. The character of such movement is different from that of mole-

cules of carbon in two clouds of smoke or molecules of water in two intermingling streams. Judging from the character of motion, one might assume that if the world is a molecule belonging to some mass with its porosity represented in the spaces between stars, the mass is liquid, or gaseous, rather than solid. If one were to leave his basis of tenable facts for the purpose of indulging in pure speculation, he might imagine the world to be a molecule in a pretty stream flowing through the estate of Antecedent Mind. In any event, we are impressed by the idea of continuity between all phenomena in what we know as space. The tendency of science is continually towards emphasizing continuity. Objects in nature are first studied as detached bodies, separate and discontinuous. Then we realize that water consists of mass, and our thoughts turn toward continuity and flowing quantities. Study of the atoms of molecules of water turns us again toward thoughts of discontinuity, but the ether surrounding, penetrating, or actually comprising everything that we know of mass, leaves us with that final impression of continuity which could make a cosmic theory include the idea of this world being only a complex molecule in a flowing mass. If energy is found to be atomic, and if a natural unit of positive electricity is discovered—one which will correspond to the electron, which is the natural unit of negative electricity, we are still to think of continuity in the ether of which all known things may be composed. Theology assumes that intelligence was given to man for the purpose of allowing him to discover the truth, but science doubts if it was given to him for any such academic purpose, because all known laws are being proven one by one to be nothing more than conventions which are convenient for intellectual purposes. Nature allows us to perceive the existence of laws which serve temporarily as ladders, and when we ascend to the limit of ladders of the

laws of conservation of energy, the laws of geometry, the laws of Newton, we find that nature allows us only to describe and not to explain. We may describe the world as a molecule in a fluid mass, but still remain unable to explain the "wherefore" of the existence of such a mass.

Senescence of the heavenly bodies which are running down is strikingly similar to a process which occurs in organic cells which are running down. These heavenly bodies were first built up very much as organic cells were first built up, or as molecules were first built up, or as electrons were first built up; then followed steps in decline. In the heavens we find new suns in process of formation, (very much like organic cells). Their nebular material may contract in such a way as to make a new lot of planets like those of our own neat little set. Similar processes are under way in the course of formation of new cells during the hourly life of an animal or plant. In the heavens we find old worn out planets that will not be employed any further with organic economics unless they are first "metabolized" by coming into contact with some compelling external force. About the same thing happens in the course of that metabolizing process which takes place hourly during disposal of our own old muscle cells. The difference between molecular processes in the heavens, and molecular processes in a frog, relates more to time expended than it does to character of processes. The heavens taken as a whole are very much like a frog taken as a whole. We need not allow our minds to become diverted from the foreground of the picture, merely because we think of the world as a more complex molecule than is the moon. The moon is more complex than an asteroid and the asteroid more complex than a meteorite. From the meteorite we may follow step by step until we reach the atom with its satellite electron. Between all of the various structures in space there is no demarcation line

to be drawn. If the whole heavens are like a whole frog, then a single point at which we observe star streams is like a single point in the lymph circulation of a frog. An organism is in space and its structure nothing more than a toy model of the entire structure of what is.

Lord Kelvin's idea was that the world was wound up like a clock, and is now running down. The moon probably went through changes similar to those which have taken place on the earth, and it has now run down so far as organic life is concerned. Elements are wound up and they run down. (Thorium for example.) Protoplasm of organic life is wound up for any given species, and it runs down. (Senescence of a variety of peach for example.)

The theory that our world was wound up at some energy factory and is now running down, fits nicely into the idea that biologic evolution is an incidental phase of cosmic evolution, and that both are alike in their salient phenomena. The running down of the charge of vital energy of a variety of peach occurs more rapidly than the running down of vital energy which was given to the genus peach, and this would seem to correspond to running down of the moon in advance of running down of our earth—the running down of our earth in advance of the running down of our private sun—running down of our sun in advance of other suns which are now engaged in the process of formation. Follow the course in paleontology of descendants from an Eocene condylarch. Some of these descendants ran down in the Oligocene Period, while others kept sturdily on through the Miocene, Pliocene, and Pleistocene Periods, appearing as tapir, horse, or rhinoceros, all from the same parent stock of protoplasm. Some varieties of the horse quickly ran out of their charge of protoplasmic energy and disappeared, but the species and genera of horse, rhinoceros, and tapir are still undergoing

evolutionary changes without giving evidence of impending disappearance. The running down of moon, earth, and sun, in that respective order, would correspond pretty well to the running down of various groups of body cells in an ageing animal. There appears to be a teleology inherent in nature which includes the whole cosmos, with the teleology of forms of organic life presenting merely one phase of a whole mechanistic plan, all processes of which are closely allied. The running down of groups of cells belonging to an individual organism—to a whole organic variety—to a whole organic order—corresponds in point of relative time to the running down of moon, earth, and sun in general relationship to a similar process affecting organic life. If moon, earth, and sun are but molecules (highly complex molecules) in some stupendous mass with its porosity indicated in that space which intervenes between their respective masses, they would still, when running down, be following laws similar to those which govern cell changes belonging to one incidental product of our earth—organic life. Furthermore, the appearance upon this earth of organic life is nothing more than what really should have happened if we take into consideration the chemistry of organic life and observe that it is merely a natural sort of result of environment. By environment I mean the presence of nitrogen, carbon dioxide, and other chief compounds of carbon with hydrogen and oxygen, particularly when the colloids with their chemical indolence were temptingly near. The presence of these substances favored the appearance of protoplasm in such an ordinary and natural course of chemical combination, that one readily finds organic life to be merely one phase of a mechanistic process which indicates continuity in plan arranged by Antecedent Mind. When teaching children about the world as a complex molecule we would begin with a description of the manner in which

two hydrogen atoms form a hydrogen molecule, each atom having the nucleus of positive charge with a single electron revolving around it. The next step would consist in a description of a water molecule with the two nuclei of hydrogen and one nucleus of oxygen arranged in a straight line, and ten electrons revolving about them in their respective zones. The teacher would gradually take his children along a dynamical scheme to the more formidable organic molecules. He would then explain the way in which laws of continuity allowed organic and inorganic molecules to join in forming a complex molecule called the world. The world would be described as one complex molecule taking its place in a mass consisting of complex molecules. The teacher might explain that complex molecules like the world run down as a result of mechanical pressure of light (radiation pressure) coming into conflict with magnetic gravitation. He would point out the similarity between this process and senescence of protoplasm in the organic cell. He would show that the atom with satellite electrons was a kindergarten toy model of the whole solar system. Biologic evolution is apparently but a minor phase of cosmic evolution, both of which processes follow similar laws with such a degree of consistency, that nothing but mutations of verbalism applied to the doctrine of vitalism can effectively turn our attention away from a clear view of the continuity of natural processes. Philosophy is quite at liberty to play with the question if the entire cosmic process is biocentric, or if organic life is only a passing incident in a chemical plan so large that physio-chemical methods of investigating life phenomena furnish the only adequate means for our arrival at sure-footed conclusions. If electricity is proven to be atomic in character, incidental phenomena of organic life like the will may prove to be atomic also. The will as a result of function would thus be allied to the atom

of matter, which is likewise a result of function. (Electron function.) Perhaps we may better consider the will as the effect of an impulse upon the ether made by atoms similar to the X-ray as an effect of the cathode ray. Science is contented with merely describing how life processes form one phase of a whole cosmic plan. It is amused when observing the vanity of any philosophy which peevishly plays at the lingo game of explaining why. Man cannot safely be entrusted with the question of "purpose of life." He is too thievish, and turns the question quickly to his private credit account. Theology has played the role of Fagin in relation to purpose questions.

The origin of species, struggle for existence, variation of types, and transmission of variations to posterity, whether described by Darwin or by Mendel, fall short in explaining much beyond the fact that a large plan beyond our comprehension is really at work. Although radium has never been isolated, we know from its combinations that it exists, and that it is an element. In the same way we can recognize a plan of nature so large that even the spiral nebulae now forming new suns may simply be preparing the way for something greater than any of the millions of suns which are in sight. Our own sun with its handful of planets is a puny sort of affair anyway, and the world is not as old as geologists and Darwinian biologists formerly believed it to be. Quantitative proportions of salt in the ocean, relative thickness of calcareous rocks, separation of the moon, solidification of the earth's crust, condensation of watery vapors, increase of temperature in deep mines, velocity of sedimentation and rate of changes of species in organic life indicate that the world is really less than forty million years of age, and that its organic life has but a few million years more to run.

The birth of an entirely new astral system is being watched

from the summit of Mount Wilson, and recorded in photographs. The pictures show spiral nebulae apparently in the act of formation into new suns. The observation is new, although astronomers have held that this might occur at any time in any part of the heavens.

Another conception of cosmic mass includes the idea that it may be gaseous, if we may say, hypothetically, that no real line of demarcation exists between gases, fluids and solids, excepting as to their relative degrees of porosity. Conception of the hydrogen atom as a small positive nucleus, with a single electron revolving as a satellite about it, might be extended into association with the idea that atomic ionization in general, as an additive or atomic property, depends primarily upon atomic weight which is proportional to the number of electrons in an atom. This idea when extended to include the cosmos may allow us to assume that movements of heavenly bodies respond to the same ultimate laws as those which regulate the movements of electrons about positive nuclei (in simple and complex atoms); and that would allow us to conceive of gravitation as a magnetic (electrical-kinetic) phenomenon. Electrons in motion produce magnetic fields, their greatest known speed nearly equalling that of light (light being the effect of disturbances in the ether caused by the vibrations of negative electrons in the atom). Among the activities of elements we may find that alpha particles of helium which are projected from radio-active substances with enormous velocities may be positive nuclei which have been deprived of satellite electrons, and they remain for some time subsequently as free lances for keeping all matter from becoming static. The recently discovered liberation of electrons from metals through the influence of light, and the discovery of the electro-magnetic nature of light, lead to interesting speculation as to changes in matter that would be made by

free-lance alpha rays of helium. Perhaps these rays are the ones which mischievously cause the transformation of resonance spectra of iodine vapor into banded spectra when helium is mixed with iodine vapor.

The old philosophers sought for perpetual motion. Like the old alchemists they seem to have been working upon correct instincts if we are to credit the idea of perpetual motion as described by Duncan in a recent number of Harper's. Thermodynamics had laws which were supposed to be final, but it is in that sense that we now find the question of the possibility of perpetual motion. As stated by Clausius, one of the laws of thermodynamics maintains that—"It is impossible for a self-acting machine unaided by external agents to convey heat from one body to another of higher temperature," but this law now apparently relates to masses of matter only and not to individual molecules. Helmholz years ago antedated this expression of the idea by stating that the law might lack validity in its relation to animate nature. Duncan presents conceivable validity of the law with reference to living beings by employing Clerk-Maxwell's example among gases.

Gas consists of particles moving at high velocity but with different speed rates, some slow, some fast, the mean velocity of all the particles being what we call temperature. If a vessel with a flexible partition were to have the swiftly moving particles placed upon one side of the partition by an agent of nature and the slowly moving particles on the other side of the partition by the same agent, the swift particles would have a higher temperature than the others. Gas consisting of one set would have higher temperature than gas consisting of the other set. This gas of higher temperature would expand, pressing the partition against the low temperature group. Consequently the higher temperature group would be engaged in actual work without the help of any external

agents in the work. It was the intelligence of the agent of nature in getting the particles separated in different compartments rather than the energy of the agent which resulted in work being accomplished.

This has significance in relation to the so-called Brownian movements of small particles. If gold in colloidal form is suspended in liquid, the particles are seen with the ultra microscope to be engaged in bizarre movements, hopping, jumping, dashing together, flying apart. These Brownian movements of particles are supposed to be due to jostling from surrounding molecules. Now the question arises if the smaller animate organisms may not be those agents of nature which have the power to separate gas particles of different velocities in their relation to molecules, and to the Brownian particles of the medium in which they are acting, air or water. If this can be proven to be true, we have at hand means for proving perpetual motion that was dreamed of previously. If we cultivate the proper kinds of organisms and give direction to the molecular movements in such a way as to give us the power we require for any given purpose, nothing would be lost, because the heat accumulated for our purposes would dissipate itself again in the common store. The unordered movements of molecules indicated by Brownian movements would then be under direction of man for his purposes. Curie and Laborde, in 1903, showed the heat-emitting power of radium bromide, in other words, perpetual motion, and science to-day believes that radium simply represents a notable degree of energy that resides in different degrees in different atoms of matter. We know that the impact of X-rays upon a plate of lead will let loose far greater energy than is received through the impact. Inventors living in the monistic unity state will be engaged in finding catalyzers for increasing the rate of change in the perpetual motion belonging to atoms.

Even at the present time a novelist with the literary license that is denied scientists might write about the ring of Saturn being formed through the agency of lower forms of animal life now beginning in the annual spring time of Saturn, and acting upon the gases in such a tremendous way that the gases are unable to maintain their own character as yet. "Their balance with organic life is not yet established," the novelist might say.

Catalysis is a decomposition and a new combination, supposed by earlier chemists to be produced among the proximate or elementary principles of one or more compounds by virtue of the mere presence of substances not entering into the reaction, but it is now believed that bodies which cause catalysis really do take part in the reactions and then return to their original conditions. Catalysis may depend upon so-called voltaic action, to generate which three heterogeneous substances are always necessary, and the third factor in many catalyses may relate to the Brownian movements of particles, the voltaic action being one of the resultants.

Nature having electrically or magnetically arranged helium in the various elements which go to make up the parts of organic machinery, now sends a message to the shop to put some of it in the form of microbes. Having put molecular machinery into the form of a microbe, she then gives it energy and sets it going, just as an engineer sets his locomotive going. Some microbes go on to be of service or of injury to plants, and some go on to be of service or of injury to animals. With some forms of microbes it is difficult to tell whether they themselves belong to the animal or to the vegetable kingdom. It was found that some of them gave out carbon dioxide and stored up nitrogen like animals, while others gave out oxygen and stored up cellulose like plants.

The microbes not only go on to make things, but to unmake them, to regulate the development of man in mentality, of the rose in expression of beauty, just as the dance of atoms proceeds with organic life, excepting that the dance of inorganic life proceeds under a different measure of music from that of organic life, following quarter time inorganically set by helium. We shall know the change of measure suited for the organic dance some day perhaps.

When atoms lead the dance in matter, helium is the musician giving time and measure. So in all affairs in all organic life, the microbe born of helium leads the dance, as the atom leads the inorganic matter.

What gives helium the inclination and power to multiply things by four? It looks like the dictation of the atom within the atom, under direction of the ether.

What plan of the sub-atom is there which directs the atoms to form microbes for the purpose of smiting the highest developed plant or animal—protoplasm spendthrift—that is developing too fast to please nature? Employing Duncan's form of expression—Every action of everything is the action of one swarm of atoms upon another swarm of atoms. In one place they make gold, in another place they make the man who seeks gold. One day they are water, the next day they are blood, always the dance goes on with atoms as the only dancers.

The atoms of the elements are related to one another as we know from our mathematical formulæ, and because of their way of acting we now believe atoms themselves to be made up of sub-atoms, and these act in the atom as the atom acts in the molecule. In biology relationship is held to mean common origin, and we are led to the point that even the atoms themselves are the product of an inorganic evolution, and organic evolution is the same thing in a higher degree.

Atoms are always in a state of discontent, always making new combinations, new associations. The molecules are in a state of discontent. Organic tissues are made of molecules which continue the discontent from the atoms. This is nature's intention. Her highest organization, the human being, is fated according to the same intention, to be discontented. We have the high-class discontent of the scientist, and the low-class discontent of the laborer. They are all one and the same thing, when reduced to simplest proportions, and represent only atomic unrest. This unrest is therefore not to be stopped, and we are to be contented with our discontent. Socialists and capitalists must never be contented with each other. A given atom does not know from one day to another how long it is to remain in the form of steam or of gold. We know only that it is in a state of unrest. We bring the will to bear, knowing all of this, in order to lessen the degree of personal unrest for the purpose of obtaining a comparative degree of comfort.

Aggregated atoms form molecules, which form the machinery of a locomotive, but the locomotive will not move until the engineer has liberated energy within it. The aggregated atoms which make the molecules of a microbe will not set it at work until energy has been liberated within the microbe. Energy for the locomotive and for the microbe comes from the sun. Both have the same source of energy. The locomotive and the microbe, each charged with energy, then goes on doing its respective kind of work. Man is not the highest intelligent agent, for he can only make the comparatively simple locomotive with its limited functions. A higher intelligence makes the microbe with far more elaborate functions in nature's economy. Man perceives that the locomotive and the microbe are both at work. He knows the plans of a locomotive engineer,—to what stations he is to

go, and how he is to conserve and employ the power from the sun which he carries in coal, to liberate for his purposes. Man does not as yet know the plan of nature with her microbe agent. He does not even know the source from which the sun derives its own power. We know the source of both commodities of energy,—locomotive and microbe—but know the destination of only one,—the locomotive—and of that one only during the period when it is useful to us.

The relations of molecules to each other, and of atoms to each other, we can now arrange in mathematical formulæ, but we cannot arrange the atomic relationship mathematically. Evidence of such atomic relationship exists, and may perhaps be reduced to mathematical formulæ by the next generation. The fact that relationship of atoms and of molecules can be arranged mathematically is in my mind evidence of some great system on the part of nature.

Intra-molecular forces are very different in their nature from the force of gravitation. We might assume hypothetically that the molecular mass responds to the pull of gravitation, while atomic constituents of the molecule retain at all times a primary relation with the inelastic ether. The radius of molecular influence may thus extend away from the molecule equally in all directions (due to atomic relations with the ether), while the molecule itself is responding to laws of gravitation.

It was once supposed that the electric fragment of the atom was indivisible, but now we have a new elementary constituent, the magnetic atomic element, and it is possible to calculate the magnetic power of a single atom. The same atom does not always have the same magnetic moment, but the different values that we assign to it have simple ratios one to another. It took us some time to become accustomed to the electron, and now we have to move on to the magneton as a new con-

stituent of matter in our problems. If the magnetones diminish with the change in temperature of an element, what becomes of the magnetones that thus disappear? Are they accompanied by variations of energy? Are chemical forces really the attractions of elementary magnets?

I like to think of the earth as a magnet by induction, produced through the influence of passing currents of electricity in space. The peculiar form of magnetism with which we are so familiar in relation to iron and steel may be a sort of "crystalline form" of electricity arranged in response to laws of symmetry, while the currents of electricity in space inducing the earth to become a magnet for all attractable substances, may be an "amorphous form" of electricity. The earth acts like a great magnet through its laws of gravitation, drawing everything toward its centre. Each one of the other heavenly bodies is also a magnet, in the sense that gravitation is a sort of equivalent for what we call magnetism. The currents of electricity which Yglesias draws from the air with his antennæ may be those passing currents which make an induced magnet of the earth, with gravitation as a magnetic phenomenon. We may consider such an idea speculatively at least.

Attraction of floating bodies for each other on or near the earth varies not only proportionately with the mass but also as the magnetic field of their respective particular electrons. Gravitation may place our earth in some grand formula arranged according to periodic law which in itself may depend upon symmetry of numbers under the influence of magnetones. To the accurate questioner who asks us about the poles, the rotation and the ultimate gravitation influence relating to our molecule of an earth we may reply that such a complex molecule as ours responds to laws which have been left for statement by the astronomers and physicists of to-morrow.

The law of gravitation has never been controverted. Every

particle of matter in the universe attracts every other particle with a force approximately as the mass and inversely as the square of the distance. This applies to the relation of an apple falling to the earth and includes the relation of the earth to the sun. It applies quite as well to the relation of any cell in the body to any other cell in the body. Every single microbe in the world with its toxin, good or bad, when brought into contact with any other organic cell brings about some change in the matter of a cell—of a whole body—of the whole world —of the whole universe. According to the law of gravitation, whenever an atom in any molecule is changed the entire universe of matter is changed, because all of the parts of the universe are so related that any change in any one part, no matter how small, affects the entire universe. Every new relation which is introduced into physiologic chemistry furnishes a stepping stone to a new discovery. The very gross changes which are observed in what we call disease—typhoid fever for instance—have been recognized for centuries, but only recently as an unbalancing of force in body cells of the individual, due to microbic action. The next stage of observation which will throw light into this century is to include an appreciation of the fact that a mere misconception may be due to microbic unbalancing of force in the physical cells of a very well ordered brain. The microbe does not have things all its own way when disturbing balance, because the body cells represent forces of another kind,—and the will of the individual as an additional force can likewise produce its influence upon forces of body cells. Consequently a man is to think of himself as a mobilized army engaged in waging battle with another mobilized army—and all for a purpose. The purpose, if we are to judge from man's past history and present station, is to develop a still more perfect being than has been developed previously. Isn't it fun and a privilege

for each one of us to be allowed to play a part in making the world better? Each one of our personal armies has been allowed a general, who goes by the name of "Will." He cannot defeat the microbe in every engagement—and the microbe is bound to win in the end—but meantime we have been constructing great works which are to be used by others who are to follow us.

Haeckel shows the relationship and chemical formulæ relating to attractions and repulsions of the inorganic world, and their influence for causing continued attraction and repulsion as they extend into the organic world. Carrel goes further and shows that organic tissues may even be made to grow outside of the body, if we furnish proper attractions.

Instinctive attractions and antagonisms between people are mechanistic in origin, and relate to the attractions and repulsions of the inorganic world. Tom Brown says: "I do not love thee, Doctor Fell, the reason why I cannot tell, but this I know, and know full well, I do not love thee, Doctor Fell." This antagonism, mechanistic in character, dates back to the chemistry of the individual. Simpler elements which are united in inorganic combination still retain their tendency toward repulsions and attractions. Their chemistry carried to higher forms of organic life continues to retain the tendency toward repulsions and attractions, so that the quotation referring to Doctor Fell expresses what occurs in simpler form among inorganic elements. Attractions and repulsions are inherent in all forms of composition, organic and inorganic. Love at first sight, and instinctive antagonisms are chemical in fundamental origin, but in higher organic forms of life serve purposes of race preservation and of individual protection.

Who knows but inorganic substances have to rest like the

organic ones? It will be no surprise if such a fact is discovered, because nothing in the Universe is really very different in its habits from anything else in the Universe.

The basis of the inorganic world is the crystal. The basis of the organic world is the cell. Space-lattices which belong to the physical construction of the crystal have only recently been discovered, and we still assume for some of our hypotheses that the organic cell also has space-lattices belonging to its physical construction.

Laue, passing a beam of X-rays through a crystal of zinc blende, obtained a space-lattice photograph, corresponding to the one attributed by crystallographers to zinc blende. He believes that the X-rays had been able to penetrate the crystal structure and to form an interference (diffraction) photograph because of their exceedingly short wave length allowing them to go where ordinary wave light could not penetrate. This observation is not only of importance in relation to Dalton's atomic theory, but it suggests to my mind an explanation for the nature of stimulation of organic cells to the point of intoxication, something which has never been explained. If the atoms of organic cells are arranged systematically, corresponding in a way to those of the inorganic crystal, normal stimuli applied to cell protoplasm would have a tendency to assist in normal cell construction. Foreign stimuli like alcohol, morphine, and microbic toxin, having shorter wave lengths than the wave length of those stimuli which are furnished by normal metabolism, would perhaps penetrate the cells in much the same way as the X-ray gets past crystal space-lattices. Toxins in such case would become foreign bodies to be expelled by the cells. Heightened activity of cells which are trying to expel intruders from their space-lattices would explain the stage of excitement belonging to intoxication. The stage of depression would mean the final exhaustion

of cells resulting from their effort at expelling these short wave foreigners.

It is a question in my mind if allergic response to a toxin is not similar to an X-ray burn, in the sense that it represents an effect upon the body cells of a higher organism which have been suddenly confronted unawares by an enemy to which they are unaccustomed. So far as we know man has been created wholly by his environment, and every kind of normal response that his cells now make to any sort of stimulus must have a phylogenetic meaning. A man's retreat from pain-causing media like heat may be traced back as a response to self-protective instinct, in which a part is taken by every cell in his body. Since the earliest days of man's evolution, the natural phenomenon of heat has been recognized by his cells as a possible danger. The X-ray, however, is something quite new to organic experience, because it does not appear in nature,—using that expression in ordinary meaning. A man's body cells are not conscious of danger from the X-ray. Because his inexperienced nociceptors gave no warning, severe injuries were caused by the X-ray before we obtained knowledge of and applied intelligence to a subject about which our cells had no previous experience. In order to carry out a parallel which may fit an hypothesis relating to allergy, let us assume that body cells in the course of evolution have developed their nociceptors for the purpose of arousing alarm when toxins appear. Body cells of the higher organisms have presumably been engaged in warfare with the microbe since the time when organic competition began. Response of body cells to the influence of different kinds of microbe toxins varies in degree, no doubt, according to the familiarity of body cells with particular toxins. In certain countries in which smallpox involves almost the entire community this disease runs a comparatively mild course, its toxins being met rather successfully

by the habituated body cells of man, in addition to the factor of senescence of protoplasm in a family group of microbes. Microbic diseases which have newly arrived in a country have a tendency to run a violent course. Their poison calls out an exaggerated protest from body cells that are endangered. A toxin or a protein poison with which body cells are wholly unfamiliar phylogenetically may perhaps cause actual disorganization of the alarmed protective forces. For instance, the injection of a trifle of poisonous egg albumin into the circulation of a highly developed organism may arouse the nociceptors of body cells to a high degree of expectant attention. That may stand for sensitization. If a second injection of egg albumin is made at a time when these body cells are tensely watchful, they do not know how to meet the enemy to which they are unaccustomed. Control over the protein poison may be lost altogether, because the body cells had not gained, out of experience, a method for meeting such an unfamiliar enemy. In order to meet microbic protein poisons with which body cells have been familiar since the days of earliest environment the blood maintains a permanent police force, consisting of phagocyte and complement. In response to the entrance of a microbic enemy with its protein poison, antibodies and opsonins are summoned by our police force. As a result of the united labor of permanent complement and summoned antibody, microbes are struck down paralyzed. As a result of the united labor of permanent phagocyte and summoned opsonin these microbes which have been struck down paralyzed are now eaten up with relish by the phagocyte. Body cells love their enemies when the latter are tastefully served up. All of this hunting and feasting is along established lines of conduct. When a new protein enemy, like egg albumin or the toxin of an unaccustomed microbe enters the circulation of an organism, it would be similar to loosing

a diplodocus in the woods where bear hunters were equipped with arms and dogs suitable for bear hunting. Hunters and dogs would all keep at a respectful distance from the diplodocus, but watching it intently, not knowing how to attack it. While they were watching this strange beast, if another diplodocus were to be loosed in their rear and its presence suddenly discovered, the hunters might die from an attack of allergy, in other words, from prehistoric fright. Body cells without weapons or dogs for meeting the X-ray seem, in like manner, to have an attack of prehistoric fright, very much like that of body cells without weapons or dogs for meeting egg albumin or a strange microbe protein. For that reason I would present the hypothesis that an X-ray burn and allergic response to protein poisoning are alike in representing the effects of fright upon body cells which have had neither warning of nor experience with new and dangerous enemies. Should this be true, men who are frequently exposed to X-ray influence of moderate degree may become less and less susceptible to its malign influence as the body cells become educated and adaptive. We may perhaps overcome the tendency to X-ray burning as we already are enabled to overcome some effects of sensitization caused by protein poisons.

Arthus found that a certain hypersensitization was specific, that is, if the sensitizing protein were horse serum, an animal became hypersensitive to that serum only, and not to other proteins. But later it was shown that any foreign protein may produce similar results, and that an animal could be sensitized to two or more proteins at the same time and would react to the successive injections of each in turn. The condition of allergy may be transmitted from the mother to her young. If a pregnant animal is sensitized by the introduction of a foreign albumin, her young when born are also found

to be hypersensitive to that same albumin. Different species of animals and individual animals of a species differ very much in the extent to which they become allergic in response to a sensitizing agent. Hypersensitiveness to a sensitizing agent may be natural as well as acquired. People who are hypersensitive to the odor of a horse—"horse asthma"—likewise have a natural hypersensitiveness to horse serum. A child poisoned by the organic oil of poison ivy may never have been sensitized previously and yet may be so sensitive that even when standing near a vine, if the wind is blowing in the child's direction, symptoms of the poisoning may appear. An excessively small quantity of volatile oil is wafted to the skin in such a case. Another child may pluck the leaves of poison ivy or handle the vine freely without any serious consequences. In both instances of sensitization (horse and ivy cases) we seem to be dealing with a natural allergy which may have been hereditary in character, the parents having been sensitized previously perhaps.

Although allergic response is apt to be specific, we sometimes find that when an individual shows idosyncrasy to as many as three excitants, like egg, oatmeal and almonds, he may become immune to the influence of two of the excitants when we systematically make him immune to one. When a number of people are subjected to a specific toxic influence simultaneously only a few of them may show allergy. Thus, one kind of scurvy appears to be due to toxin from a microbe which lives about the necks of the teeth. The growth of this microbe is favored by salty nitrogenous diet; yet there are often men on board a scurvy ship who do not make allergic response. If inorganic excitants cause allergic response in the form of nettle rash, for instance, and if inorganic substances do the same thing, allergy and idiosyncrasy manifest their close relationship. Further than that, the testimony offered by this

relationship may open a vista toward the point where the inorganic merges into the organic. Our synthetic organic products took us far in that direction. Allergy to organic substances and idiosyncrasy to inorganic substances, when manifested in one sign like nettle rash, would seem to me to have great significance.

While crystalloids do not sensitize directly, they make compounds with colloids, which as proteins then sensitize. The individual would not show "idiosyncrasy" to a crystalloid like iodide of potassium excepting for such compound as this crystalloid promptly makes; but we may nevertheless say that the individual is allergic to iodide of potassium,—meaning in its combinations.

We often recognize the presence of a most interesting fact without realizing its significance. Hay fever, for instance, is spoken of in a joking way as belonging to the cleverest people. It is said that distinguished people are about the only ones who suffer from hay fever. This is quite true as a general statement, and means that the most highly cultivated people with the most highly sensitizable protoplasm are the ones who are most vulnerable to various influences which cause allergic response.

We note the movements of one of the lower forms of life, *amœba limax*, and then note the occurrence of similar movements belonging to cells of our own bodies, in what we call amœboid cell movements. These are spoken of as indicating possession of life. Certain movements of precisely similar character occur in substances, organic or inorganic, which are not called "alive",—movements of an oil drop, or globules of mercury for instance. We have to speak of these as amœboid movements, yet oil and mercury do not live as we understand life. The movements are due to perpetual physical

and chemical reactions causing changes in surface tension, leaving us to conclude that amœboid movements of living things, and amœboid movements of things not living, are subject to general laws of matter, and closely related. The movements are produced by agents causing similarity of movement. Certain masses of elements not living (colloids) are so closely related to certain masses living, that we cannot avoid the feeling that life-forms may still be arising from matter, although such primitive new forms may not have the power for surviving long, nor for ascending far by evolution in the presence of highly evolved competition belonging to present conditions.

When considering the question of development of organic life and if simple cellular forms may originate *de novo* at the present time, it may be well to reason backward from certain facts which relate to growth and maintenance of a complex mass like that in the concrete example of the larval eel, which has no alimentary tract or excretory organs, as we understand these terms, until it has attained the length of about four inches. It must apparently live then, like acalephs and certain still lower forms of sea life, upon materials which are absorbed from sea water. Sea water contains an abundance of colloids and of crystalloids. Some interesting questions arise. Do the cells of the larval eel absorb from sea water crystalloids or colloids, or both? We presume that they absorb crystalloids directly by osmosis, but we think of crystalloids as belonging only to waste products of animal organisms. Do the cells of the eel convert absorbed crystalloids into colloids which then do work as such before being split up again into such crystalloids as urea and carbon-dioxid? There are chemical and biological reasons for believing that colloids as well as crystalloids may be absorbed directly as such, as when animal tissues in the laboratory take up colloidal dyes. Furthermore, we

can sensitize higher animals to various proteins by alimentary feeding, and we know that crystalloids do not sensitize excepting in their combinations. It seems probable that the larval eel may absorb both colloids and crystalloids directly. In the body they are synthesized into the organism's own proteins, which, in the process of destruction, are then again converted into crystalloids which escape from the body.

The phenomenon of solution of crystalloids is similar to the phenomenon of solution of colloids, excepting in characteristic time differences of a sort which would make colloids fit well into the familiar time-rate of organic metabolisms. The slow diffusion of colloids in fluid media, and their arrest by colloidal septa (cell membranes), would seem to introduce conditions favoring metabolic processes in the organic cell. Their chemical reactions are feeble, but the addition of a crystalloid in solution may displace colloidal material. Such a feature conducted by the organic cell would apparently represent the basic feature of primal organic metabolism. When speaking of the large-atomed colloids, we may perhaps as well speak of the large-moleculed colloids. These may perhaps be constituted by the grouping together of a number of smaller crystalloid molecules, which then furnish the basis for colloidality. This would be due to peculiar intimate molecular constitution rather than to peculiar intimate atomic constitution. The low osmotic pressure of colloids would nicely allow them to maintain their integrity in the organic cell in the presence of crystalloids with which they are in contact in sea water, until the cell had time to bring about metabolic changes in accordance with its own interests. In what way may the organic cell bring about such changes in its own favor? From whence comes the energy? This perhaps may be answered in several ways. (1) Colloids already possess the cohesion energy belonging to their mass. The key to life seems to lie in the

nature of cohesion. We may consider cohesion in the light of residual chemical affinity acting over molecular distances in such a way that attraction predominates over repulsion between groups of alternately (electrically) charged molecules. Colloid molecules may perhaps cohere according to laws similar to laws which regulate cohesion of crystalloids, including polymerization, but in their specific form of chromosome of an organic cell. (2) When subjected to the influence of light energy, colloids show individuality over crystalloids by scattering and polarizing a beam of light. Transverse vibrations of light when thus sent along a single plane might be employed by colloids for accomplishing special work. Reaction of coherent colloid molecules with some external energy like that of light may force them to take in and cast out simultaneously such atomic groups as may fit into their molecular structure. This latter phenomenon we may call "feeding," and it constitutes a distinguishing feature of organic life. (3) Colloidal metals possess ferment action (a catalytic effect which may be powerful). The changes brought about by such inorganic ferments are allied to metabolic changes, and when taking place in the animal cell, may constitute part of its demonstration of metabolic energy. (4) We differentiate between the first step, absorption by osmosis, and the second step, that of assimilation which is due to ferment action. Feeding occurs through the activity of ferments, and colloids possess inherent ferment power. Life would therefore appear to be something quite calculable. Vital energy of the organic cell may consist of colloid cohesion energy, plus polarized light energy, plus catalytic energy, plus other energies including that of osmosis. If every one of the ninety chemical elements and a number of their compounds have been transformed in the laboratory from a crystalloid to the colloidal state, and *vice versa,* it is not difficult to believe

that the laboratory of cells of an organism like the larvel eel may do the same thing to an extent requisite for its needs, in advance of development of an alimentary tract and excretory organs. A crab when moulting its shell does not contain within its economy the calcium carbonate requisite for hardening the new shell. Calcium carbonate is absorbed directly from sea water by cells of the pellicle which then forms a hard shell. If the present-day crab can do this, I see no reason why the primitive cell which later made a crab could not absorb inorganic substances and make use of them without depending upon any vegetable intermediary agent. Fungi which live in dark caves work without chlorophyl when assimilating elements which apparently have no relation to any antecedent chlorophyl process on the part of other plants. Laws of molecular attraction which gave us chlorophyl, gave us also working cells of other sorts which had the power of transforming energy for cell building purposes. The highest organism with its elaborate digestive and excretory apparatus is nothing more than a highly developed colloidal system, and its so-called physiological functions are colloidal functions.

Now let us return from a consideration of the highest animal organism to that of vegetable organisms and of the inorganic crystal. Colloids in cell form possess mutability, while crystalloids in crystal form are notable for stability. Colloids are continually engaged in metastasis. The slow chemical changes taking place in organic tissues, when compared with the rapid inorganic reactions of crystalloids, would belong to colloid reactions characteristically. Animal organisms depend upon colloid substances for food, while vegetable organisms depend upon crystalloid substances for food, employing the word "food" in the sense that intercurrent photosynthesis is required for making minerals available for plant use. The original divergence of lower forms of life to follow animal or vegetable

evolution respectively, perhaps began from such differences in their food. Animals use colloids directly, while plants must change crystalloids over into colloids before they can become media for expression of life. The plant apparently requires light energy for development of vital energy, in order to combine molecules of crystalloids in colloid form, and it seems probable that the animal also requires light energy in addition to inherent colloid energies for life purposes. A plant engaged in the work of raising an inorganic crystalloid into an inorganic colloid and then placing it among the organic colloids, would represent an evolutionary process belonging to the idea of continuity in and relativity of all things in nature. Continuity is further continued if the mineral colloid which has become a vegetable colloid is in turn transformed into an animal colloid by an animal. There would seem to be little of mystery in the idea of lowest forms of life beginning from a grouping of colloids in chromosome form according to laws of molecular attraction (and similar to crystalloid formations), followed by fission or mitosis under strain caused by an external energy like that of light. The animal cell differs from the crystal mainly in its colloid content, and we may assume that the latter introduces the vital element which distinguishes the growing of organic mass from the growing of crystalline mass. The word "life" in such case is merely an academic term, employed for purposes of our convenience. We may easily conceive of colloids grouping themselves in chromosome form according to laws of molecular attraction similar to those which cause crystal formation, but the colloids go on with their mitosis and fission, while the crystal,—which may split by fission due to internal strain,—has already reached its limit of evolutionary development. We might assume that chromosomes of organic cells, like crystals, originate *de novo,* without introducing any particular element

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of mystery. Both are subject to destructive agencies, and if organic cells now form *de novo*, they are probably incapable of meeting competition from established forms of life and of going on to higher evolutionary development. The life processes of such simple cells, however, may be quite as complete in their way as are those of cells of a larval eel, which represent the hereditary memory of cells of a form of higher life which has become established.

Let us call the chromosome of an organic cell a "colal" (kolla), as an analogue of crystal. The process of morphologic arrangement of molecules we may speak of as "collization," and analogous to crystallization. The imperfectly formed nucleus of a bacterium would correspond to the imperfectly formed crystal of some elements.

Let us assume that chromatin when formed as a result of ordinary chemical reaction from inorganic elements is then arranged in the chromosome according to some law of crystallization which is acting in the presence of colloids. We would seem to need nothing more than some external force for starting organic life out of the combinations which might then readily ensue. When giving consideration to the question of possible sources of external energy, light is perhaps the first one which naturally comes into mind. We may take into the problem certain known phenomena which are parallel to our hypothesis. Chlorophyl, for instance, is capable of acting as a transformer of light energy, and of causing synthesis of organic matter from inorganic matter. The initial stage consists in a reaction of carbon dioxid and water to produce formaldehyde and oxygen, and the external energy for this process may be supplied from vibrations of light. Chlorophyl is most actively engaged as a transformer for light energy when the sun is shining most brightly upon plants. Formaldehyde, which Baeyer showed to be formed in the course of

this process, is rapidly changed into more complex substances like the carbohydrates. When thinking of chlorophyl as a transformer of light energy, we have to keep in mind the simple fact of that particular action, and forget for the moment that chlorophyl is in itself a complex organic substance. Better yet for our purposes, is the fact that Moore and Webster have succeeded in producing organic matter (not living) by the action of light upon inorganic metallic colloids, the latter acting as catalysts for light energy in the same way as our complex chlorophyl acts. That brings us very close to an hypothesis that inorganic colloids, when arranged in the form of chromatin, become catalysts of light energy. They allow the chromatin to follow an action which we assume is allied to crystallization in the inorganic world, but resulting in the formation of a chromosome and an organic cell instead of a crystal. Just as a crystal grows out of the matter belonging to its environment, so the organic cell grows out of the matter belonging to its environment. Energies of the crystal are confined to simple but definite order of arrangement of its molecules. An organic cell, on the other hand, extends its energies to the formation of a more complex but still definite order of arrangement of molecules. A crystal apparently can work in the dark with its inherent forces, but the energy of light would seem to be needed for an external compelling force for driving an organic cell ahead, up to the limit of its power for making chemical combinations of the materials which are close at hand.

Is light energy always required as a compelling force for the development and multiplication of organic cells? Certain fungi and deep-sea amœbæ work in the dark and build cells. A natural answer would be that crystallization and cell formation may be so closely allied that dark-loving species of organisms do not require chlorophyl or chromosomes as agents

for building their structures,—which are very simple as compared with the structure of higher plants and animals. (Fungi work without the aid of chlorophyl.)

We are left with the need for an explanation for the growth of certain lower forms of organic life in the dark. In order to avoid clouding of the argument I have purposely avoided reference to any sort of light excepting forms of light in which organisms commonly grow upon the surface of the earth. Is there any other energy which may take the place of sunlight energy as an external compelling force? In the absence of sunlight radium may perhaps begin what sunlight continues. Radio-activity, which is believed to exert some degree of influence upon the entire mass of the earth, may furnish the external force necessary for that initial energy which forces the chromosome into growth and segmentation of its cell. That radium has an influence upon organic cells is shown in its destructive action upon organisms. This action is more destructive upon the young cells of neoplasms than upon other cells of a highly developed organism which carries the neoplasm. Radium which furnishes destructive energy (like sunlight), when employed by the surgeon for a purpose, may perhaps furnish creative energy (like sunlight), when acting with less potency in the mass of matter forming the earth. In that case radio-activity and sunlight would be allied in their influence upon organic life, in the sense of furnishing two kinds of light energy, one kind furnishing a compelling force for the simple development of inorganic materials which have taken the organic form,—and the other light energy furnishing what is required for driving cells into the formation of highly developed organisms. The mere fact of chromatin attracting staining agents of the microscopist in a selective way indicates its power for attracting to itself, selectively, matter which it may employ for building purposes.

Our hypothesis relating to the beginning of life brings up always the question of spontaneous generation, and we may reasonably make assumptions from one of two premises: First, that all possible chemical combinations relating to chromatin formation occurred many ages ago, and their progeny now occupies the earth. Secondly, spontaneous generation of chromatin combinations is still going on, but their progeny cannot now compete with forms of life which became established at an earlier day. Failing to compete, the new cells do not proceed to the formation of new plants or animals of higher order. If life is actually produced in the laboratory finally, my present idea is that it will result from the synthesis of knowledge belonging to four groups of men: (1) Chemists, who have already produced organic matter; (2) crystallographers, who already know certain laws which govern the form of arrangement of growing masses of molecules; (3) physicists, who already know much about the influence of various kinds of light energy upon molecules of matter; and (4) biologists, who already know how to cause the egg of some lower forms of animal life to undergo segmentation without spermatozoan stimulus, and who have already caused organic tissue to grow in artificial media. We might imagine that the mathematical physicist would also prove to be of service with his partial differential equations.

Organic growth of one sort may begin with the formation of some hydro-carbons with an ethyl, methyl, propyl, or formyl radical. We may find that propyl formate is the primitive material that some cells develop for defense purposes. It is now used for defense purposes by such higher organisms as certain species of *Coreidæ*.

Nuclear material in bacterial cells is not arranged in the form of a morphologic nucleus. Bacterial cells divide in a simple way by fission like crystals. Cells of higher organisms

containing a morphologic nucleus divide indirectly by mitosis, but the fundamental operations of plant and animal cells are manifested in bacteria as well. Bacterial metabolism and cellular metabolism of the highest organisms likewise have many features in common. If light energy or colloid ferment action furnish the *élan vital* for cells after nuclear material has been formed according to laws of symmetry, these forces might cause internal strain which would make demonstration in the simple fission of bacterial cells which have no morphologic nucleus, and mitosis of higher cells with their higher nuclei. The two processes of segmentation are perhaps quite as closely allied fundamentally as are the metabolizing chemical habits of both kinds of cells.

Molecular attraction when carried back to its atomic origin in electron action, would seem to include not only the idea of crystalline formation, but also that of cell nuclear formation through the action of attractions which must at least be germane to each other.

One theory of the beginning of life includes the idea that it started with the vegetable habit of making simple combinations between carbon-dioxid and the elements of water and adding minerals. According to this theory, animal life appeared subsequently as an offshoot from vegetative processes and animal organisms then depended later, in one way or another, upon vegetable organisms for furnishing sustenance. Opposed to this idea of the beginning of vegetative life alone primarily, we may perhaps place such an example as that of the larval eel, which has no alimentary tract or excretory organs until it has attained a very respectable size. It can make no use of vegetable organisms or of any other organisms for food purposes, during this part of its growing stage. It begins life, to be sure, upon a basis of protoplasmic energy furnished by the fusion of sex elements from two

parent organisms, but growth due to assimilation must come from the power of its increasing number of cells to assimilate inorganic elements; and cells which are enabled to do this may reasonably be supposed to have had similar powers as simple cells primarily.

The artificial parthenogenesis in plants which I have described elsewhere appears to be a phenomenon requiring chemical explanation, and for purposes of temporary convenience I have named it stereochemic parthenogenesis. Opposite sex masses appear to retain fixed molecular identity and yet one mass excites the other mass into activity. There may be isomeric problems to be worked out in relation to the part played by enzymes of the sex masses. It has been observed by others that certain seedless fruits may depend upon the influence of pollen which did not lead to fecundation. Parthenogenesis has been effected by exposing the female gamete egg cell to various forces, and to changes of temperature. Much of this work indicates that in fecundation osmotic permeability of the cell is changed and this is the necessary factor for segmentation. That would seem to take us clear back to the electron theory, and to the idea that a difference in potential due to the presence of anions on one side of the cell membrane and of cations on the other side of the cell membrane, stimulates the protoplasmic contents of the cell (electrolytic conductor).

Man may be held to consist of the three physical entities, if we say that this community of cells represents matter, his cohesion of cells represents energy, his mind represents the ether. The three physical entities are held by the monistic unity theory to be one, and inter-changeable in form. Ergo, man is matter according to one special pleader, and man is mind according to another special pleader. Man is soul according to another special pleader, who differentiates soul

from mind. In the monistic unity church and state man is held to be all three and one, like other animals and plants, differing from them only in degree of proportionate effect on any one of the physical entities. The monistic unity idea finds no line of demarcation between chemistry and physics. Probably at some time during this century we shall find that no line of demarcation exists between chemistry, physics and vital energy.

If there are hypothetically only three physical entities in nature, ether, energy and matter, then instinct, intuition and reason, having common ancestry, must retain common relationship, and separate classification can be nothing more than arbitrary, in adaptation for our purposes.

Our brain protoplasm seems to have been normally sensitized toward intuition as the most persistent and dependable guide for man through the ages, rather than toward intelligence. Intelligence of all degrees employs the brain-cells for immediate adjustment to the needs of the brain in daily life, or for planning our whole life course, but intuition and instinct employ different sets of brain-cells carrying their respective hereditary cell memories. All these cells are the property of one city of cells,—one man.

It is generally admitted that the animal and vegetable kingdoms have a common ancestry in the cell, which was modified by environment to go on to the development of plants or animals.

The uni-cellular organism has a capacity for indefinite subdivision and perpetuation. The amœba is an immortal organism. It divides itself into two parts, each one of which proceeds to divide into two more parts. An amœba may be killed, but it never dies a natural death, although it ceases to exist as a single individual. The protozoan, then, is immortal. In higher organisms death of cells through influences

of natural selection occurs in the course of their struggle excepting when a cell reproduces itself. In cancer we have riotous multiplication of young cells from which resistance has been removed, in a return to primitive existence of unchecked resistance. The increase of cancer probably represents a part of the history of decadence,—lack of protecting cells.

Nature allows protoplasm to be built up just so far with each group of plants or animals and no farther, purposely limiting development of the cell-city (a plant or an animal) through instruction given to its protoplasm.

The subject of protoplasmic limitation of a family among men, or of a family group among species of plants, does not as yet belong to quick adjustment of practical idea, although the facts are well-known to laboratory biologists. I had a fine red oak tree, about one hundred years of age, that was dying. It stood in good ground, and there was no reason apparent to me for its gradual demise. An expert forester was called in consultation. He made various suggestions which were of temporary service in obscuring symptoms. Several other experts were asked to see the tree, including an entomologist and a phytopathologist. They also made suggestions relating to the obscuring of symptoms. The tree slowly continued to die, just as though nothing at all had been done, although the symptoms (dead limbs) were disposed of. A neighbor spoke to me about a fine red oak on his property that was dying. It stood on the river bank in ground so rich that one was tempted to eat a part of his peck of dirt right there. The ground in which that dying oak tree stood would make a farmer's mouth water. It suddenly occurred to me that the red oak reached its protoplasmic limitation in this locality when it had arrived at about one hundred years of age. On looking over a large number of trees of this species in the

vicinity, that proved to be the case. Some of the experts who saw the tree were quite familiar with the subject of protoplasmic senescence as a laboratory fact, but it did not occur to them to make practical application of what they knew. The men who treated my red oak tree were all like doctors who treat neuralgias by alcohol injection, and who give drugs for a case of dyspepsia—missing the fundamental needs. The knowing of a fact and the using of a fact may be quite separate matters. Countless fathers of families are in distress because their sons are workless or worse. Good parents have told me with tears in their eyes of making painful search within their own characters in an effort to discern the reason for their children's worklessness. In most of these cases it is no more the parent's fault than it is the fault of the red oaks at Stamford to lose family vigor at a certain period in the course of their development. Protoplasmic limitations are reached by a family group of the variety of the red oak and by a family group of a variety of *Homo sapiens,* according to the laws of protoplasm.

In view of these facts we need a good explanation for the persistence up to the present time of certain organic forms of life which belonged to former days; for instance, the giant trees of the Pacific Coast, the bald cypress and certain ganoid fishes.

We cannot always know whether the existence of a lonely species representing an entire family means that other species had been wiped out in the course of evolution, or if there never were any other species. There is paleo-botanical evidence in the example of the ginkgo tree that its ancestors have disappeared. In the case of Leitneria there is no such evidence, and yet this may simply mean that remains of its ancestors have not as yet been recognized among fossil plants. The okapi represents an entire family. In the instance of the

shrew-mouse (Hyrax) ancestral types seem to have disappeared, leaving such great gaps, that the present representative stands for what we may almost say is a whole order. Whenever highly specialized monotypes exist in the organic world, we may assume either that special factors for protection carry them safely past enemies which are still existing, or else, in the course of evolution the enemies have died away before nature carried out the complete plan of the struggle to a finish.

These enemies may have disappeared through the effects of ordinary opposition displayed by their own enemies, or because their allotment of protoplasmic *élan* gave out. At the present time the gar, amia and sturgeon appear to be entirely free from the parasitic glochidial form of mollusks. These mollusks limit the development of many of our present day species of fishes which serve as their hosts. In the Silurian period mollusks were extremely abundant, and they may have increased to an extent sufficient for destruction of many of the fishes. There was great struggle for survival among the mollusks in the Silurian period, and if species of mollusks which were parasitic upon the gar, amia, or sturgeon became lost in the struggle, these three fishes, freed from their principal agent of control, then went swimming on happily down through the ages, and they remain with us to-day. The paddle fish belongs in the group of ancient ganoids which is present with us this evening, but I have not been able to determine if this species is also free from larval molluscan parasites. At this point the question of protoplasmic limitation is introduced. We can state more or less definitely the protoplasmic limitations of an individual in the animal as well as in the plant world, but protoplasmic limitation belonging to a race or species is so largely determined by the degree of relative opposition on the part of enemies that it cannot be clearly defined. In the case of the gar, amia and sturgeon,

we likely enough have an illustration of extension of protoplasmic limits, resulting from removal of a chief enemy—the molluscan parasite. In the case of man we have evidence of a hastening toward protoplasmic limitation through the influence of his chief enemy—the microbe.

Senescence of protoplasm apparently occurs more rapidly among lower forms of life than among the higher forms. For that reason an epidemic "runs out," as we say, in a year or two, while a nation of people as a whole may not show marked senescence of their protoplasm for several hundred years, although finally the protoplasm of a nation also runs out. Meantime the nation is looked upon by birds and animals as an epidemic. Nations in the past have always occupied the position of epidemics in relation to nature's resources. At present the nations on earth hold the position of epidemics toward nature's resources. Nature, no doubt, has some distinct purpose in the spreading of an epidemic of scarlatina microbes, or in the spread of an epidemic of people of any developing nation. Watch a crowd of boys who are out for fun and see if this fun is shared by the things they find, frog or turtle, butterfly or bird, moth or beetle, flower or bee. This is no criticism of the boys. They are bully fellows, every one of them. I never saw any other kind of boy in a crowd. My point is, that we are naturally and instinctively an epidemic, like one of locusts or of cholera microbes, in our relations to other life and to nature's resources. A boy and a dog are never so happy as when they start out together to kill something. The boy whistles and sings, the dog barks and prances. Neither one of them would be so overjoyed if he were going to save something. When the boys get older they lose this primitive kind of destructiveness and use a higher degree of more thoughtful intelligence by burning the forests and exhausting the soil.

When cultural limitations have been reached in a family, and protoplasm begins to become senescent, perversion of natural instincts may be shown by individuals of both sexes. These perverted instincts are quite as strong as natural instincts (morbidly exaggerated sometimes). They seem like real instincts to their possessors, some of whom respond to the false instinct without giving much thought to the matter. Often there is a great struggle with conscience, but any instinct, natural or perverted, maintains a steady pull, like the bend of a bamboo rod upon a trout. This steady pull commonly tires out a struggling conscience, even though the individual may retain a gyroscopic action of self control in general. We often find the highest grade of mentality and extreme degrees of refinement occurring along with the early stages of senescent protoplasm and perversion of natural sex instinct, because these people are doubling roses. They may be pitied for their condition and admired for their cultural beauty. As a rule they do not marry. If they marry there are usually few children or none, so we need not be disturbed by any fear of what one may term an ordinary phenomenon in the plan of nature. Books upon the subject give a wrong impression and suggest the idea of a dangerous spread of moral weakness. It relates to senescent protoplasm of cultural limitation, and is a subject for consideration by the physiologist rather than by the moralist. I have known a few of these victims to have children of first rate general type, but particularly vulnerable to the infections. The motive for marriage was usually social prestige or economic advantage for the parent who introduced newer and stronger protoplasm. The progeny of these children in turn, would be particularly apt to show features of decline. Usually a family of plants or animals runs out very quickly after the appearance of sex perversion.

Sociologists try to explain the falling birth-rate as due to special conditions. They are right so far as they go, but are like doctors who treat symptoms. The special conditions of the falling birth-rate depend upon instinctive response to nature's order to have breeding stopped in families and in nations with senescent protoplasm.

Many people who are childless say: "Oh! we could have them if we wanted them!" As a matter of fact the spirit of not wishing to have children is as purely abnormal as is a defective ovary, both relating to cell structures approaching a stage of senescence. A man's "words are his own, but his acts are the acts of his ministers," and the prime minister is the microbe. It guides mode of thought quite as well as it guides any other expression of physiology.

Every family can run just so far upon its stock of protoplasm,—as an engine runs a certain distance with its load of stored energy in the form of coal. Those who load up energy for the family in the open air of the country, carry the family much farther than the ones who load up in the city. Every lot of loaded cells, called a family, will carry in proportion to its accumulated energy.

Man must continue to die of old age because of the continued warfare between the groups of cells in his body, aside from the guerilla warfare carried on against his cells by microbes.

A man or any other animal, or plant, consists of an aggregation of amœbæ. Some of these amœbæ,—leucocytes for instance,—are quite as mobile as the amœba which occurs singly in water. Other amœbæ,—bone cells for instance,—are fixed, and do not change position in relation to other cells of the same sort. Every tissue of a man's body consists of living amœbæ, excepting the hair and the epidermis. These latter structures are merely aggregations of products of amœbæ.

which have ceased activity and which remain as mechanical protectors, like the pretty outer bark of a birch tree.

The *amœba proteus* consists of a single cell capable of reproducing its kind indefinitely. Higher in the scale we find a protozoan, *gonium sociale,* composed of a group of four cells. Ascending further in the scale we find groupings of cells in multiples of four, like the helium combinations in matter. All of the while in organic ascent we are reaching larger villages of cell grouping, then towns, then cities,—as in the higher vertebrates. A man then is nothing but a metropolis of amœbæ. Whether or not nature caused aggregation of cells for purposes of defence we cannot know, but the effect of such grouping or the purpose of furnishing protection against invading microbes is in good evidence. We thus see that the simplest forms of life multiply indefinitely, and are destroyed freely, but when nature wished to grow higher forms and to grow microbes at the same time, she had to put a fence of special cells between them, just as the horticulturist finds it impracticable to raise chickens and strawberries in the same garden. He is much interested in chickens, and he is also much interested in strawberries. Nature is much interested in man, and quite as much interested in microbes. Horticulturist and nature,—each must place fences between objects of interest which are to be preserved. As soon as we left the lowest protozoan, fences began to be built by special cell arrangement, with protective cells on the outside and germ cells hidden beneath. That looks very much as though nature purposely planned warfare between man and microbe as carefully as a football game is planned to-day, with excellent order and system. The spirit of man, as well as his body, develops in accordance with what the microbe permits, and as expression of the spirit depends upon the character of metabolism conducted by body cells. The supreme

regulating agent in man's life activities must be the microbe, even though a supreme directing agent for man and microbe—the infinite ether—occurs back of the microbe, nature's supreme organic regulating agent.

The animal in present day life recapitulates its ancestral history, beginning from the simple cell. At a more advanced stage in development of the embryo, man has gills and a tail,—and gradually passes into still higher stages, but carrying along some derelict structures like the wisdom tooth and the appendix vermiformis. Sometimes even the gills persist in adult life in the form of branchial fistulæ,—sometimes a rudimentary tail apparently remains, as suggested in an article of mine in the *Annals of Surgery* relating to coccygeal fistulæ. Darwin held the coccyx to be a rudiment. From his "embryonic rests" of unused cells, we get neoplasms suggestive of relationship of man as far back as to the amœba.

The reason why baldness, or premature thinning of the hair of the head is so common is because the hair is one of the disappearing structures, like the appendix and the wisdom tooth, and is consequently more vulnerable to attacks by bacteria. Much of the baldness or thinning of the hair is accelerated by a microbe which is at work in the hair follicles. These hair follicles are usually well developed in the early years of life, but have a tendency to show the characteristics of other rudimentary structures in their lack of resistance under conditions of civilized life. Baldness, or thinning of the hair, can be controlled very frequently by the use of antiseptics, sun light, and by massage which whips up the hair follicles into a certain degree of active resistance. More and more attention will have to be given toward preserving the hair if in centuries to come we believe it to be a desirable feature. The most highly developed men, physically, have a tendency to be the most hirsute, but as the sexes approach

each other in type we may have almost a reversal of this tendency.

On account of the number of derelict structures which one finds in the human body, it is said that man is a walking museum of antiquities. In addition to the museum, he carries also an extremely interesting garden with his large bacterial flora.

Heredity is said by Haeckel to be cell memory, but this memory is influenced by outside forces (environment), because the cell must respond in its very nature to external stimuli. It must absorb nutriment, and must divide for purposes of propagation.

Cells have three life processes—functional, formative and nutritive. Functional when we think, formative when old cells are replaced by new, or when new cells are formed in the course of development, nutritive when the cell stores up potential from food.

A description of metabolism is taken from Foster: "The series of chemical changes occurring in nutritive material taken into an organism, by which it is converted into an integral part of the living substance (constructive metabolism, anabolism) and the changes taking place in living substance by which energy is set free (destructive metabolism, catabolism). In the setting free of energy the complex material in the living substance is reduced to a simpler form, oxidation occurs, and carbon dioxide and other waste products appear."

Nature placed together certain inorganic elements, added vital energy, and made protoplasm. That was the first unit of all organic life, the chief constructive unit. Nature then made the microbe out of protoplasm. That was the second unit, the chief destructive unit. There are no problems in organic life, animal or vegetable, which do not include these two units. No animal or plant can live, and few ever die

excepting through the agency of the microbe. (An animal or a plant may sometimes die through the influence of inorganic elements,—wind and flood,—but cannot live or grow, excepting in the presence of, and with the aid of, the microbe). There is no human activity of any sort allowed without a microbe clause in the contract with nature. Nature apparently does not care to have this fact generally known, until by evolution she can develop a perfected race which will be competent to make proper employment of such knowledge.

Bacteria rule and control everything in organic life. Nature sets bacteria at killing mankind at a chosen time, just as the farmer kills his chickens at a chosen time which ensures most profit.

From the protoplasm of the amœba that absorbs inorganic food, to the protoplasm of a plant that guides the tendril to a limb and the top toward the sunshine, to the protoplasm of man, which guides his will, there is a supply of pabulum toward which microbic influences are incessantly active.

The microbe is the Atlas of organic life, carrying the world upon its shoulders.

When bacteria die, what becomes of them? They are used as food by other bacteria, or by higher organisms.

In the organic world, the microbe wields far more influence than is wielded by man or any other organism.

By "microbes" I mean bacteria chiefly, and by "microbe toxins," not only the products of their activity,—indol, skatol, phenol, mercaptan, ptomaines, hexone bases, hydrogen sulphide, and other poisons,—but also their protein contents, which are freed when they die. These latter cause so much disturbance to living organic cells when suddenly freed from great numbers of microbes at once, that abnormal work is placed upon some of our protective cell resources.

It is a common thought among the laity to consider the

word microbe as referring to something destructive. The horticulturist has learned that the very life and character of his plants must depend upon increase of microbes which are beneficial to his plants. That is what cultivation and fertilization mean,—the allowing of good microbes to grow, the kind which split up organic matter and inorganic matter in the soil in such a way as to allow plants to make use of the materials. It is also known that bad microbes, destructive ones, increase under precisely the same conditions, and the race in the garden is always one with three starters—plants, good microbes and bad microbes,—all starting off on even terms at the drop of the farmer's hat.

Why do we cultivate the ground? In order to allow bacteria to do their work in the best way. Cultivation of the soil in the garden and in the field has no object whatsoever excepting to give bacteria a chance to grow and to take their part in the development of higher plants. Good and bad microbes grow simultaneously.

The kinds of potatoes I knew as a boy are gone with the old families that raised them. Where are the roses that I knew as a boy? There are now better ones perhaps but they do not please me more. That however may be a question of first love. The old-fashioned flowers, including Four-o'clocks, Sweet Williams, Petunias and Phlox still seem more beautiful to me than more modern flowers, because they were my first loves. What happens to highly developed pigs? The mothers eat the little ones unless precautions are taken by the farmer, and the ones which do grow up are vulnerable to bacteria, and may be wiped out by the cholera microbe. Why does cholera not wipe out the wild pigs? Nature keeps the cholera bacillus for just as definite a purpose as we keep our pigs. The cultivated man is used for purpose of high efficiency when he is useful as such, but when he is not useful to his fellow men,

nature drags him off to the bonfire. Nature uses bacteria in various ways to develop a man and then to dispose of him, just as she employs bacteria for and against every other living thing.

The theory of microbe influence in natural selection among plants gives us a wider Mendelism, and we may have now a wider Darwinism in its relation to animals. In both cases we are to consider that protoplasmic molecule and microbe are the basic units in the organic struggle for existence. This idea does away with inconsistencies that were quoted in opposition to the theory of struggle between adult higher forms of life—chosen for observation by Darwin and by Mendel.

The distribution of a species of plant or animal depends chiefly upon the microbe. Plants which are enabled to make best use of microbe products from the ground, dominate other species of plants. Animal life depends upon the kinds of plants which thus survive and which serve as a basis for their food. In the Mammoth Cave in Kentucky, a number of forms of animal life—and many of them predatory—seem to depend upon one species of plant (a fungus growing in the cave) with the exception perhaps of the fishes, which get some other food in the cave water. This fungus probably cannot grow unless microbes have prepared the soil for it. With all higher plants at least, we know, that microbic preparation of the soil is essential for their growth.

A horticultural philosopher says that San José scale has been a blessing to orchardists because it wiped out the badly kept orchards and greatly increased the profit on fruit from well-kept orchards. In the same way we assume that our microbe enemies are blessings when considered in a large way,—wiping out badly kept families and making the well-kept ones much more valuable than ever before.

Not a wheel would turn at any factory were it not for the microbe, because no man would be on earth to construct machinery.

We know the old saying that fire is useful as a servant and destructive as a master, but fire represents only one of the three physical entities—energy,—heat energy. Combine energy—vital energy—with another physical entity, matter, in the form of the microbe, and we again have a useful servant and a destructive master, but now we may apply the superlative, and say that the microbe is the most useful servant that is known, and the most destructive master that is known. Energy in the form of fire simply goes so far as it can reach material which will support combustion, for it has no intelligence. The combination of energy and matter in the form of the microbe, however, increases the range of efficiency for good or evil because of direction given by instinct, and instinct allows the microbe to become an active agent in seeking matter which it can destroy selfishly for its own purposes of nutrition.

Bacteria are the pawns with which nature plays her game with man. Nature and man play together as father and son would play chess together, taking here a king, there a queen, there a knight, but needing pawns in quantity for the play.

Every single microbe is a unit in the chain that turns the wheels of life on this earth.

It is sometimes asked: "Why does nature have all of these bacteria with which to bother man?" That is a question of anthropocentric conceit. Does not nature think quite as much of bacteria as she thinks of man? Must she not have a fertile field for growing her choice pets of bacteria?

Men when under the influence of the anesthetic of conceit ask why God should favor the microbe. They question the taste of divine will exercised over human will in such a way.

Their conceit leaves entirely out of mind the idea that nature is as much interested in microbes as in man.

Thirty years ago, when the microbe first engaged interest in New York in relation to wound infections, the idea was taken up by a very few men, but was looked upon as fanciful by the majority of older men of established ideas. In ten years there was general acceptance of the principles of asepsis; but my first book relating to the subject, published in 1886, was ridiculed for four or five years. Before that time Lister had made slow headway in Great Britain with his ideas of antisepsis, but they were finally taken up in Germany and then made rapid progress. Pasteur, before Lister,—showing the microbic nature of fermentation and putrefaction,—had been attacked almost as violently as were innovators in medieval times, who were burned at the stake. The progress of bacteriology, then, has been marked by violent opposition to Pasteur; by obstruction rather than violence in relation to Lister; and with an amused tolerance rather than obstruction in relation to those of us who stepped forward in the later eighties to advance the microbic theory in its application to the subject of wounds. It was not until the nineties that microbic influence in connection with contagious and infectious diseases began to be generally understood. This idea was met by opposition on the part of really responsible men, who did not propose to have any fanciful ideas interfere with their chosen line of thought relating to infections and contagions. Progress is at last so rapid in this field of study, that the relation between the microbe and infectious and contagious diseases belongs to established knowledge,—established during the latter part of the nineteenth century. Now for the next step!

Society consists of people who are responding, in accordance with their natures, to both external and internal stimuli,

the latter point not generally being taken into consideration. Men react automatically to both sets of stimuli. Responding to external influences they follow example and precept belonging to the environment, but limitations are set upon the degree and character of this response by toxic stimuli, which are not recognized as such.

It is known that the microbe has charge of life and death questions in the organic world, but the fact has not been recognized that it likewise has charge of all intermediate processes (like instinct and reason) between the beginning of life and ending by death of every organic individual. The latter fact is presently to become a study which will engage the deepest interest of men throughout the civilized world.

In the early part of the twentieth century, Jacobson, Reed, Eccles, and the author of these notes, began to describe the influence of toxins of various diseases in causing mental effects belonging to such diseases. My own crude notes here presented are perhaps the first step toward the idea that definite kinds of microbes produce not only definite impressions upon the character of body and mind in disease, but that all human activities, in conditions commonly called conditions of health, are dependent upon limitations set by the microbe. It is my belief that a large number of men, widely separated, already possess enough information in the form of isolated facts to place this later idea upon a substantial basis as rapidly as we can obtain collective grouping of their data. If this proves to be true, the twentieth century will be notable as one in which all human activities can be shown to have some sort of relation to microbic influence, and the nature of this influence can be stated in a scientific way. A new perspective will then be taken for each and every problem relating to sociology in the broadest meaning of that word. The profound influence of the microbe in causing disease of plants and animals is

already well understood in all civilized countries, but the more sublime influence of the microbe as director of evolution in relation to the minds and bodies of man, and of all other animals and plants, is now to be brought forward as a subject for larger discussion.

To repeat a bit, it is not more than thirty years ago, we may say, that the microbe entered the port of New York, so far as our knowledge of it was actively engaged. It was then recognized by a few men only in relation to infections in surgery. All the younger men became suddenly wide awake upon the subject, while most of the older ones made great objection and laughed at the idea of microbes having anything to do with infections in surgery. A very few years later the whole theory was accepted in relation to sepsis in surgery, and then men began to talk and write about the microbe in infectious and contagious diseases. This idea also was met with strong opposition and ridicule. A few years more passed and the microbe was accepted as regular company for the infectious and contagious diseases. Now we are about to speak and write about the influence of the microbe not only in infections of surgery, not only in contagions and infections of fevers, but in relation to every single activity of man, of animals, and of plants. This new conception will meet with the same strenuous opposition, the same display of wit, contempt, ridicule, and various emotions, and then will become established as an idea nearly as quickly as it became established in surgery and in medicine.

Although enormous strides have been made in bacteriology, we are even at this day only upon the margins of the subject. One after another various kinds of bacteria are believed first to be accidental in relation to a disease, then they are held to be saprophytes. The anerobic bacteria when studied, are to open a great new vista in relation to bacterial diseases. We

commonly read reports of finding certain bacteria of common forms, together with incidental statements about various cocci and bacilli. These "various cocci and bacilli" may, however, be really the important but unrecognized elements in the disease. The reason why the anerobes have not been traced more carefully is because their growth often seems paradoxic, many of them occurring under various forms. As rapidly as we take the trouble to test exudate or tissues for the work of anerobes, we become astonished at the results of the examination. Liquefaction of tissues, characteristic of parasitic anerobes, is found in many cases of enteroperitoneal disease, where the *staphylococcus albus* has furnished police protection, and where streptococci, staphylococci, and colon bacilli have been walled-in safely by the lymphatics. Anerobic bacteria come along and liquefy the protective wall, precipitating the dangerous features in the case.

Up to the year 1911, hardly anyone would have dared to suggest that the symptoms of typhoid fever might represent allergy to toxins of the specific bacillus, but I believe we are very near to the time when symptoms of dementia præcox and of other insanities will also be classed in the allergy group.

Who would have thought a year ago that we could be made immune against the poison of mushrooms, and yet it has just been learned by Abel and Ford, of Johns Hopkins, that the poison of *Amanita phalloides* is similar to the bacterial poisons, and that immunity can be secured against it.

As knowledge increases relating to any one subject, that subject seems to comprehend about everything in the world. One may to-day give a definition of chemistry as "everything that is going on" and he would probably be correct.

It will not be a century, perhaps not even two decades, before bacteriology will be the work horse of all of the sciences, and psychology will be the driver. Into the cart will

go philosophy, political and social sciences, and the natural sciences. Psychology itself will be in the cart also, but acting as driver. Forward movement will be made only as fast and as far as bacteriology is able to draw the load. Psychology as driver will also have the function of loading all of the natural and the humanistic sciences into the cart.

As fast as bacteriologists develop more delicate technique they will find more and more microbes in the blood itself, although many of these may be harmful only as their protein contents are set free in a way to produce allergy. For instance, Rumpf (*Muenchener Medizinische Wochenschrift,* Sept. 3, 1912) says that tubercle bacilli occur far more frequently than was formerly supposed in the circulation of blood, not only in tuberculosis, but in health. This may account for certain characteristics belonging to the so-called tuberculosis habit, but in which the bacilli have not made common demonstration. He states that these tubercle bacilli from the blood itself do not seem to transmit tuberculosis to inoculated animals. Kennerknecht found tubercle bacilli in the blood in 91 per cent. of 120 children examined, including 74 per cent. of 31 children supposedly entirely free from tuberculosis! Rumpf was puzzled over the fact that these bacilli did not develop tuberculosis lesions in inoculated animals, and suggested three possibilities: (1) Either the supposed tubercle bacilli were not such. (2) The bacilli were not viable. (3) The blood vehicle in which they were injected protected the animal against them. The first supposition may be true, but it leaves us still with the fact of bacilli in the blood, the protein contents of which may be causing allergy. In regard to point two—they may not be viable because representing some immature form of the tubercle bacillus,—a larval form. In regard to point three—he states that in some experiments in which the bacilli were cultivated in pure cultures

from the blood, animals then inoculated with the cultures gave tuberculosis to other animals. This might indicate that the tubercle bacilli in certain culture media develop a mature form. This particular explanation has not occurred to observers so far as I know, but it seems to me that we may accept that explanation for the present. We may have characteristics of the tuberculous habit showing in individuals who do not present lesions as we commonly recognize lesions—intermediate hosts perhaps. This would take us to a still more remote point in allergy, showing that it may cause changes involving all construction which we recognize as belonging to the tuberculous habit. If these features are true in relation to some such disease as tuberculosis, the bacteriologist of the future is to find many other bacteria presenting similar problems.

The idea of the microbe as a chief factor in modifying all human activities will lead to as bitter a controversy as Pasteur had to endure when showing the nature of fermentation and its connection with the growth of the yeast microbe. As fermentation really was due to growth of the yeast microbe, and as the action of the human mind really is influenced by the microbe or actually does depend upon microbes in both first and last analysis, the controversy will simply be interesting while it lasts and all will come out into the light presently with the result of opening still newer vistas.

Professor Theobold Smith called attention to the fact that civilized man, in subjugating or annihilating animals, finds the difficulty of controlling them in inverse proportion to the size of offending species. Man can dispose of inimical tigers more easily than he can control inimical men. There is less difficulty with inimical men than with rats, less difficulty with rats than with mosquitoes, less difficulty with mosquitoes than with microbes, which latter offer such stupendous difficulties

that we can never hope to have more than a few hundred species under effective control.

The idea that mind cannot transcend the microbe on the whole will lead to a shorter battle than was fought over the question of fermentation, because the requisite factors for establishing that idea are really extant at the present time, and it simply requires some one with time at his disposal to collaborate the facts.

We make almost hourly advance in the refinements of applied bacteriology. It was not so long ago, only yesterday, that we held as a glorious advance the method of securing immunity from typhoid fever with the use of killed bacteria (the Wright-Leischman method), but with that method there was sometimes pain, sometimes much discomfort, and a temporary morbidity unfitting one for work for a few days. This year comes the refinement of the Metchnikoff-Besredka method which uses weakened typhoid bacilli instead of killed bacilli. This does away with the discomforts, and with the morbidity, and still further removes the risk of leaving typhoid "carriers."

Just as the bacteria rule and control all plant nutrition from development to destruction, so they rule and control all animal life, but the botanist first recognized the relationship of bacteria to the higher organisms. The zoologists have not as yet taken up the study in any comprehensive way. The protoplasm of plants is sensitized normally in one flower, let us say, which used red for attracting insects. Its chlorophyl transforms the iron molecules which were white into vibration in red. Another plant has its protoplasm sensitized for the purpose of producing odor, as the honeysuckle, to attract insects. A decadent plant under too much cultivation,—in other words, under too much bacterial influence—may go to work at mutation consisting of doubling of its flowers;

nature soon puts a limit to the development of that feature of the plant. "You may make beauty up to a certain point," nature says to the rose, "but you will then have gone far enough," and the bacteria will promptly become its mortal enemies. If one man has his protoplasm sensitized to vibrate particularly to sound,—he is the musician. Another is sensitized to respond normally to vibrations of light,—that is the painter. If their protoplasm is excessively sensitized beyond the normal, they become double roses in music and in art, geniuses in other words, and arriving toward the point where nature gives orders to the bacteria to head them off. Rose and honeysuckle, musician and painter, are all simply employing energy in response to vibrations in the whirls of the dance of their material atoms, with measure and rhythm set by the ether for the players. The microbe turns out the lights at an appointed hour.

I conceive of the world of people as a flower garden with the roses in various stages of doubling.

In the organic scale, as we ascend from the lowest forms of life, there is found a grouping of sterile cells to provide against attack upon sex cells by microbes. The group of protecting cells increases and becomes more elaborate as the organism becomes more elaborate. The group of sterile cells, food-providing cells, is directed forward during locomotion in volvox, while the generative part, the self-fertile cells, are hidden below the peripheral cells. The two types of cells were presumably once alike, and the variation was caused by necessity of protection in the life and death struggle, this variation proving of life and death value. The molecules which are attractive to parasites are more or less eliminated from the protective cells, but such molecules being necessary for cell multiplication, the process takes place through a special set of cells with differentiation of function. As we

ascend the scale of organisms the fertile cells are hidden more and more in safe places beneath the sterile or food-providing cells, the protective cells. In the higher forms of life, we come to highly elaborate groups of cells for special function. In the lowest protozoa the germ cells are about one hundred per cent. of the total, while in the vertebrata, they form a small fraction of one per cent. There is progressive recession of germ plasm, and increased proportion of the sterile or soma plasm. In other words, there is a sign which may be read as meaning incessant struggle of tissue cells against parasitic enemies of the microbe world, the struggle increasing as organisms become more complex. In cell development and construction under conditions of cell poisoning, the germ cells are injured as well as are the sterile or protecting cells, and where there is a high degree of chronic colon poisoning, for instance, the progeny of an individual are feeble or decadent, if any are produced. Direct lessening of ability to reproduce is more or less due to the introduction into the circulation of cyto-toxins, or cell poison from the colonic microbes, and this is of fundamental importance in estimating the probable domination of any one race of men. The greater the number of germ cells that are left uninjured by cyto-toxins, so much greater the reproductive ability in that race. What is practically direct lessening of ability to reproduce, is called indirect in the laboratory, because "direct destruction" in laboratory terms means parasites directly in contact with cells. The greater the proportion of nutritive or protective cells,—the better nutrition and protection of both groups of cells—so much better the proportion of good germ plasm and of soma plasm to be sent down the family by hereditary entailment. Ward lays down the rule that when a parasite develops in an organism it has a tendency to cause sterility of its host. This may be direct or indirect according to laboratory terms: direct

only by mechanical means as when an œstrus larva destroys the testes, and indirect when microbe toxins act as cyto-toxins for the germ cells.

A still more indirect influence, but quite as effective, however, is when the nutrition cells fail to aid in making good germ cells. It is found in the course of experimentation that under the artificial sterilization produced by parasites various degrees of sterilization occur. The sexual instinct is lessened or becomes perverted, and it is observed that each one of the sexes loses more or less of its characteristic attributes, and tends to acquire in the same degree those of the opposite sex. This laboratory experience with animals is so parallel to what we observe in phenomena of decadence in man, that one naturally adopts at once the suggestion that effeminacy and viraginity in all degrees are caused by microbe parasites, which increase to proportions of excess under the conditions of modern culture and civilization. The same microbe which leads to great display of genius through excessive stimulation of certain brain cells, may be expected to lead toward elimination of families which are placed in an environment giving lessened oxidation of toxins of the same microbe. Tuberculosis in fowls has been observed to lead to indirect sterilization. In certain aggregations of tuberculous people at climatic resorts there are observed to be few children (although some individuals are prolific). This is due not only to the sterilizing influence of the tubercle toxin, I suppose, but also to the fact that individuals most vulnerable to this toxin are apt to be ones representing beautiful doubling of the rose,—the penalty of high civilization. It may be that an investigator like De Vries may some day take the question of doubling of the rose back to that microbe toxin influence upon vegetable germ plasm and soma plasm which induces morbid mutation under

conditions which favor overstimulation of both sets of cells. The protozoan poison in pigeons infected with bird malaria leads to infertility if the protozoan microbes are abundant. Pigeon malaria leads to production of feeble offspring of these pigeons when fertilization does occur.

Could Darwin have lived at the present time we might have a far wider reaching Darwinism, not dealing with adult animals as units in the struggle for existence, but with their cells and molecules as units struggling with microbes. This idea would certainly place bacteriology as the study of prime importance for any race that is to survive. The question of destruction of unfit germ cells and survival of the fittest germ cells, in my belief, underlies all questions relating to the struggle for existence. Cyto-toxins carried by the blood must have as distinct influence upon the development of the fetus as they have in their influence upon physical cells of the brain, and upon cells of the adult body in general. Richards says that substances exercising a toxic action on protoplasm and which are destructive in large doses, simply furnish stimulation in small doses. This is what we might say of alcohol, and shows the nature of stimulation of the mind of a genius by doses of other toxins which are overstimulating. These overdoses poison his germ cells, and subject his weakened progeny—if he has any—to the danger of being sterile or having perverted sex instincts due to wounded sex cells. The reason why so many individuals can maintain a fair state of health in the presence of chronic poisoning from such a group of microbes as the colonic group is because the tissues, through natural selection, have acquired a high degree of resistance. These same individuals, however, may quickly succumb to pneumococci or to typhoid bacilli, which make a sudden onset upon tissues not prepared by natural selection to resist their cyto-toxins. In the case of typhoid we have already learned

how to increase resistance artificially, and in our bacteriology of the future the chosen race may be enabled to overcome or control practically all of the microbe influences which are now so destructive in wiping out various races at present upon earth. Other microbes, however, will by that time have introduced complicated problems anew.

Body cells in contact with bacteria or their products produce antibodies which can destroy bacteria. Bacteria being living cells, are in turn angered by their enemies, the body cells, and the bacteria proceed to produce antibodies which can destroy body cells. One or the other must become King Arthur at the battle of Camlan. From the respective points of view of His Majesty the Body Cell, and His Majesty the Microbe, infection is nothing more nor less than an immunizing contest. Each warrior in the battle game is engaged in manufacturing cyto-toxins for the purpose of destroying his opponent and making himself immune against his enemy. The ability of any given bacterium or any given body cell to win depends upon its respective ability to manufacture enough aggressions, very much as the Indians manufactured arrows. The doctor can now take enough of these arrows belonging to one side in the contest and use them against the other side at his will in an increasing number of kinds of diseases.

There is evidence that the adrenal glands, thyroid glands, and pituitary body take an active part in the development of antibodies. A very little inherited defect relating to any one of these glands throws the whole protective machinery out of order.

One gland of the adrenal group—(the thyroid), which is situated superficially, often shows direct response to toxemia of enteric or other origin. In cases of rheumatoid arthritis enlargement of the thyroid gland is apt to occur, and rheumatoid arthritis is sometimes benefited at once by the use of

thyroid extract. We now know some of the bacteria which cause arthritides. Thyroid enlargement can be produced experimentally in man, and then reduced by the administration of gastro-intestinal antiseptics, as shown by McCarrison. When colonic intoxication is large in degree and expressed in enlargement of the thyroid gland there is apparently a marked hyperplasia of tissue, but the gland diminishes in size when the amount of intoxication is lessened, either through lessening the influence of the original toxic source, or by the use of vaccines prepared from cultures of colon bacilli (demonstrated in the experiments of Langmead). If this fluctuation in the size and character of one of the adrenal group of glands is observed to take place, little imagination is required for assuming that similar changes are taking place in all of the ductless glands, as a result of toxic processes of colonic origin.

Internal secretion from ductless glands may act at a great distance from its locality of production. A little surgical operation at one end of a deer will prevent the formation of his great antlers at the other end. If the internal secretion which controls the development of antlers is removed when antlers are present they will remain permanently in place instead of being shed annually according to the natural plan.

Microbe toxins are injurious when they insidiously arouse or continue the emotions. People of emotional temperament, with or without special microbic influence, are seldom in the best of health, and the reason is biologic in its nature. The eccentricity and irascibility of "temperamental" people is readily explainable according to the tenets of mechanistic psychology. Emotions represent increased activity of the entire motor mechanism of that machine which is composed of organic cells in the form of a man. This mechanism has been developed in the course of evolution for the purpose

of preservation of a certain organic type. The organism employs all of its activities in their varied manifestations for type preservation purposes, and for nothing else. It does this in three forms of effort:—for defense, for escape, and for procreation. All emotions relate to some one of these three primal purposes of a motor contrivance which we call a man. When an emotion is strongly aroused, there is at first an increase of energy-giving substances in the brain cells, but these substances rapidly fall below the normal amount when an emotion is prolonged. Simultaneously an increased activity is to be observed in all of the physiologic factors which have been adopted in the course of evolution for the purpose of increasing motor efficiency. They furnish the organism with a sufficient amount of fuel for the accomplishment of the object for which any particular emotion was primordially intended. Physiologic functions which do not contribute directly to motor efficiency in the presence of an aroused emotion are inhibited during the progress of that emotion. The digestive function and functions of nutrition and repair are held temporarily in check in order that the organism may concentrate every bit of its available energy upon the appropriate action for which that particular emotion was primarily intended. When an individual is laboring under the stress of a strong emotion his whole body is being prepared for action in an expensive way, very much as when a warship is being prepared for action. If the action for which an emotion was phylogenetically intended is carried into effect, the special secretions which ductless glands furnish for the purpose of activating the motor organism (man's martial musicians) are then disbanded. The musicians are metabolized and utilized in the physiologic economy of the organism. Any one who allows himself the excitement of a strong emotion of any sort is doing so at the expense of concentrating his whole physi-

ology upon a special effort which is motor in its natural significance. If his whole physiology does not suffer under the stress of such special business, a man may not be aware of the debilitating effects of a strong emotion. He recuperates automatically. Balance is restored particularly well if the individual takes exercise enough to oxidize those waste products which accumulate in excess during the time when his physiology is busy with a strong emotion. There is a formation of acid by-products which must be disposed of by the liver chiefly. When we observe an individual who is angry we know that he is becoming actually sour, and this sourness is demonstrable in the laboratory. People who allow themselves to have strong emotions are apt to be the very ones who take insufficient exercise, and the reason for that is because the debilitating effect of an emotion leaves them disinclined to make further exertion of any sort. In days to come, when people get to understand the subject fully, they will arrange balanced rations of emotion and exercise, very much as they now arrange the balanced ration of food upon a diet chart:—Angry from 2 : to 2 :45 P. M.—brisk walk from 2 :45 to 3 :30 P. M.—*et cetera*. One who adopts the habit of allowing any sort of emotion to appear in excess, be it jealousy, grief, worry, envy, in fact any sort of emotion, must remember always that his whole physiology has to stand the consequences. It is not only the effect of overwrought nerves from which he suffers, but actual demonstrable cell change takes place in all of those organs of the body in which cells are working over-time when maintaining an emotion. In case such organs do not have full opportunity for recuperation their cell organization becomes permanently deranged, and we have in consequence various diseases of the heart, lungs, kidneys, and other vital organs. Control over the emotions is exercised by the will, but freedom of the will

is restricted through the influence of microbic toxins. A vicious circle may become established whenever disturbance of digestion following upon indulgence in an emotion allows microbes to increase disproportionately in the alimentary tract. Their toxins being absorbed in excess of the metabolizing power of the individual, must have something chemical to do. They may engage in the mischief of arousing or continuing emotions in a morbid way by over-stimulating the ductless glands. Over-stimulated ductless glands pour out an excess of activating secretion for the motor organism. An individual suffers morbidly from the effects of anachronistic activation of his motor organism consequent upon the arousing or continuing of emotions which follow such activation. According to nature's plan, appropriate action should normally follow an emotion. A man's machinery is working under unofficial orders when microbe toxins call out activating secretions, and michievously oblige emotions to appear. These emotions give orders to the organism to engage in those actions for which the emotions were phylogenetically intended. Microbe toxin in such a case has called upon the band to play martial music when no soldiers were in sight. The soldiers had to come on the run because the band was playing in response to orders coming from the microbe instead of coming from headquarters of the organism.

Are any toxins essential? Yes! we cannot breathe without the stimulus of the toxic carbon dioxide. Good and useful toxins stimulate in a perfectly normal manner a genius whose methods of living are good. Poincaré, mathematician, physicist, astronomer, and philosopher, was studied from the psycho-physiologic point of view, and found to be perfectly normal, with faculties harmonious and in complete equilibrium, but he lived a regular life,—a simple and wholesome life. His toxins were probably those of symbiotic bacteria and of

normal metabolic chemistry, which are essential to the normal action of cells. Many a doubling rose is remarkable for its vigorous constitution as well as for its beauty, but it has entered the particularly vulnerable group of roses. It requires far more care for maintenance of its organic equilibrium than does the wild rose.

Protoplasm contracts and expands under influences of various kinds. We know that cell adjustment must depend upon the relative degree of expansion or contraction. Structures are composed of cells,—therefore structures must vary in character under influences which expand or contract protoplasm. Function is closely allied to structure. Toxins influencing structure of cells of the physical brain, for instance, influence function, giving expression in form of thought which corresponds to the influence caused by any particular toxin which causes contraction or allows of expansion of protoplasm of the cells. This takes us incidentally to the drug question.

When an older man who has been successful in life looks back in reminiscent mood to boyhood days in his home town, and asks about companions of former years, he finds many vacant places in the ranks, and largely due to the effects of alcohol. Whenever prohibition has made alcohol unprocurable, morphine or some other drug has usually thinned that part of the population which started out full of hope and ambition. When restrictive laws become still more effective in protecting people against resources for quieting their disturbed cenesthesia, the men who have formerly gone down with alcohol and drugs will exert peculiar mental influence upon the mass, making life more difficult and more complicated for all. Then will come the newer ideas about oxidizing toxins, protecting the genius against himself, and developing whatever peculiar efficiency is possessed by the generally

inefficient. A newer and better civilization will result. The life tenure of neuropaths will be lengthened somewhat, but they will still remain so vulnerable to influences of illness and so instinctively opposed to procreation that even a newer civilization will not introduce the menace of over-population by the physically unfit. The term unfit is employed in kindly meaning, and applied only in relation to nature's plans, and not in relation to the blessed companionship of intellectually and artistically valuable members of society who are beautiful double flowers whom we cannot spare for a moment.

We do not realize what complex reciprocal changes are taking place every moment in our bodies in response to such every day influences as those of coffee, alcohol, toxins and light. If a number of specimens of a crustacean like Diaptomus (naturally indifferent to light) are placed in a dish of water near the window, they remain distributed about in the water. Add a trifle of alcohol to the water and the little animals immediately collect in a dense cluster on the window side of the dish. They become positively or negatively phototropic in response to alcohol or caffeine in the presence of light, and we may fairly assume that our own body cells respond in a similar way to many influences. By feeding material of one of the ductless glands (thyroid) to tadpoles we can make them change into dwarfed but fully developed frogs in the course of a week. By feeding material of another ductless gland (thymus) to tadpoles we can prevent them from ever becoming frogs.

Laboratory experiments with alcohol upon guinea pigs of successive generations have shown that the progeny are nervous, undersized and defective. Chemical examination of the tissues of animals subjected to experiment shows that the generative organs have a special affinity for alcohol as for some other toxins. Both the sex cells and the soma cells of

progeny are injured in consequence. Experiment animals however were subjected to long-continued alcohol influence. There is fair presumption that these animals would not have been injured at all by occasional small doses of alcohol because the daily physical reactions are sufficient for maintaining a balance, as they do with other toxins not in excess. When discussing the alcohol questions it is best to neither minimize nor exaggerate, because the spirit of the day is one of calm understanding about spirits of the day.

There will never be agreement upon the question of the value or the harmfulness of alcohol. The reason for this is because alcohol when ingested causes a rapid oxidation; it liberates heat rapidly, and heat energy and other energies immediately set up a series of reciprocal reactions. This means that the question runs to infinity and the various sides of the alcohol question—physiologic, pharmacologic, and sociologic—will always be presented by special pleaders without possibility of anything better than a compromise for practical guidance. Alcohol does about everything that its friends claim for it and about everything that its enemies claim for it. When placing it in the group with tea, coffee and other drugs, and stating the hypothesis that all of these substances relieve painful cenesthesia due to toxic influence, only a part of the influence of these various beverages is stated. It is not my intention to include the idea that tea, coffee, tobacco, alcohol, and other drugs have any action beyond quieting a disturbed cenesthesia, but that particular action appears to explain the universal desire for these agents.

In some unstable nervous organizations the many little upsets during the day may allow capsulated enteric bacilli to start off into rapid growth. In other more stable nervous organizations a great shock is required for accomplishing the same effect. It is disappointment in love perhaps in a given

case that allows bacteria to develop to the point where they lead to serious cell injury. There is the same tendency to cell injury during an alcoholic debauch. Saccharomyces toxin, like various other toxins when in excess, seems to injure cell protoplasm to the point where the entire aggregation of cells (the man) feels in his subconscious mind that he (that is, his cells) is worthless.

Every mental process passes into bodily action of some kind, and practically each cell of the body is connected with nerves (excepting the cells of the epidermis and the blood cells). If we know that morphine and alcohol act upon mental processes, and know that all mental processes pass into motion of some kind, it is easy to understand why the toxins of morphine and the toxins of alcohol are acting upon all cells of the body.

When toxic influences of bacteria are disturbing the mind there are often many other physical signs in evidence simultaneously,—for instance, a hot head, cold feet. The mental action at the same time is quite as definitely pathological as are the hot head and the cold feet.

Different toxic substances act as differently upon the mind as they do upon the body and upon the soul. We know that morphine stimulates the power of imagination. Under its influence a man is wholly absorbed and fully entertained all alone by himself with the mental images produced during the toxic stage. We know that alcohol as a toxic substance acts in quite a similar way to morphine in exciting emotions, but with different emotions. It leads a man to seek his fellows' society for discharge of feelings and exchange of emotions. We know very well the action of toxic morphine and the action of toxic alcohol,—recognizing the difference in their actions,—but we have not as yet given attention to the fact that toxins of different microbes have quite as distinct and different influences upon the mind, body and soul. Yet a far

greater number of people are daily under the influence of toxins produced by microbes than are daily under the influence of morphine or of alcohol.

Microbe toxins act much like alcohol, giving us quite the same history of stimulation followed by depression. The sufferer from migraine may be in high spirits, even hilarious, for a day or two before an "attack," and what is called "attack" and recorded as such for purposes of classification is only the depressive end-effect. One might as well say that a man was intoxicated with alcohol only when he arises with a headache and nausea next morning,—and not intoxicated during the stage when he jumped on the table and sang. Yet that would only be a parallel to the way in which we have classified many other headaches, as well as major and minor toxic psychoses, up to the present moment.

Insomnia and headache from toxic influences give an indication of the extent to which toxins may be exerting influence upon the thoughts of an individual.

A headache is the ringing of an alarm bell in the tower. Stop and listen when it rings. One reason why we have headaches and many neuralgias of the head is because the fifth nerve, which supplies the investing membranes of the brain is connected through its ganglia with the sympathetic nervous system. Whenever anything is wrong or causing disturbance of the sympathetic nervous system in any part of the body it is apt to ring the alarm bell in the tower. Headache! What's wrong at a distance from the head? That's the question when the alarm bell rings.

An object lesson in relation to our constant resistance to microbes is shown commonly when people return to New York after a summer's vacation. They "catch cold" as soon as they get among New York microbes. People soon acquire resistance, and for the most part maintain this resistance while in

the city, but lose it again during the following summer's vacation in the country. In my own experience the quickest way to cure a cold has been to go down on the Great South Bay duck shooting for a couple of days, perhaps getting chilly and wet during that time. As for draughts,—they have nearly upset the sloop sometimes when three reefs were in the sail,—and yet the "cold" was cured because of fewer microbes in the pure air of the bay and because of increased oxidation of toxins.

The fact that a number of microbe toxins act like drugs in causing symptoms of excitation followed by depression has been overlooked apparently because nature did not wish us to see, preferring to put blinders on us. The microbes of a common cold give such increased mental activity at the onset that the mind ranges rapidly over a large number of subjects and very clearly. It is difficult even for one to sleep because of activity of the mind at the beginning of a common cold. At the same time there is increased physical activity, and one is apt to make other people uncomfortable by his frequent movements when trying to sit still. Put in a row ten examples, the first five relating to the influence of drugs, the second five relating to the influence of microbe toxins, and we have the following comparison. (The drugs produce their action promptly, and that is perhaps the reason why the similarity of action of more slowly acting toxins has not attracted attention.)

(1) Alcohol—Increased mental and physical activity, followed by depression.
(2) Opium— " " " " " " " "
(3) Cocaine— " " " " " " " "
(4) Chloral— " " " " " " " "
(5) Hashish— " " " " " " " "
(6) Toxins of a common cold " " " " " " "
(7) " " migraine " " " " " "
(8) " " paranoia " " " " " "
(9) " " cyclothemia " " " " " "
(10) " " melancholia " " " " " "

The similarity then will be observed, but the drugs are a matter of choice, while the microbes are not a matter of choice; we have to take whichever one catches us. Drugs are usually chosen which give a sense of peace and of well-being in addition to increased mental and physical activity, although there are many other drugs which would increase mental and physical activity without agreeable accompaniment. Among some microbe activities a sense of peace and well-being may accompany increased mental and physical activity. The toxins of migraine and of cyclothemia at the beginning of an attack may exercise a definite influence upon the imaginative and creative faculties, lifting the mind above distractions very much as alcohol does. The stimulated individual rises superior for the moment to small irritations of commonplace surroundings, suppressing the image of matter-of-fact every-day interferences with elevation of his spirits. Many thousand times a year patients say to their doctors: "I never felt so well in my life as I did just before this thing came on; in fact, I felt unusually well, and spoke to my friends about it." Parents say to the doctor: "My boy was never so full of life and enthusiasm as on the day before he came down." The range of diseases in which a preliminary state of stimulation occurs runs from A to Z, from appendicitis to zoster, including in the range a very great variety of diseases. The testimony of so many witnesses to the fact that microbe toxins stimulate as drugs stimulate, and then depress as drugs depress, has been wasted upon our profession because the professional mind was not ready to receive the testimony. Attention had not been directed to the point.

The finding of one species of microbe in excess in a laboratory examination does not mean necessarily that it is the malefactor. It may be killing some other microbe and liberating the toxins of the other one instead of producing the impres-

sion through its own toxins. It may also be a malefactor by simply calling out antibodies from body cells in excess, and it is those antibodies which work mischief.

The microbe lies in wait at the spring of the alimentary tract for precisely the same reason that the tiger lies in wait at the spring where its prey comes to feed. Microbe and tiger have to be fed. They are both efficient organic units in nature's plan. Both are expert at going to the most likely places for securing food. The tiger waits where the antelope will drink, the microbe waits where the lacteals will drink.

We know the nature of a large number of microbe products which are manufactured in the alimentary tract, and which are absorbed into the circulation, producing more or less structural changes in cells and functional disorders of organs, unless the toxins are thoroughly metabolized. Among these toxins are: cadaverine, neurine, putrescin, buteric, formic and acetic acids, sulphuretted hydrogen, indol, skatol, phenol, and the special toxins of more than sixty microbes which have been identified as common in the lower alimentary tract. The colon bacillus group, formerly held to be non-pathogenic, has recently been studied and traced to the point where its peculiar depressive form of intoxication is known, when it occurs in excess beyond the metabolic powers of the individual. Quite as large a range of influences may be found later to belong to other groups of intestinal bacteria not living in the colon, and such rapid advances are now being made in the subject that one's cheeks are flushed with the excitement of the chase. If one goes off for a week's vacation, he gets behind the times.

Food materials and waste products poured into the blood by the lymphatic system are elaborated and subjected to high-grade chemical processes. There are many kinds of refineries, each group turning back into the blood what it receives from the blood but in refined and changed form. In addition to

these products we have also the special internal secretion of each gland. The products of the ductless glands include the hormones, each kind of hormone having special work to accomplish, in stimulating various cells to take up nutrition, to multiply, or to carry on function. Hormones are the trained messengers in a business house. If these messengers become intoxicated, they deliver wrong or incomplete messages. They get intoxicated when microbe toxins reach the ductless glands in excess.

Professor Metchnikoff says that indol and phenol are chiefly responsible for the decay known as old age, and this may be postponed by destroying them with his recently discovered sugar producing bacilli.

The central parts of the alimentary tract have an important flora at times, and the mouth and colon have a rather definite and continuous flora always. In the colon we find a number of species of bacteria which produce indol. Escherich, in 1886, was the first to call our attention to the large number of kinds of bacteria in the colon which showed in stained specimens, but they could not be cultivated by methods then in use. Since that time we have developed one after another of these microbes by new methods, but still there are many bacteria showing in stained specimens which do not as yet accept our invitation to come out and have their life histories studied.

Aside from the harmful action of bacteria which live outside of the alimentary tract, protein products of many bacteria living within the alimentary tract, when in excess, cannot be metabolized. Entering the circulation beyond the capacity of the individual for destroying them, they act like injected proteins, by inducing the formation of antibodies having the properties of enzymes. This may occur particularly on some one day. A subsequent activity of growth of these bacteria

say a month later is equivalent to reinjection of protein, which becomes digested by the proteolytic antibody, and toxic products result. All this is speculative at the present hour, but it is based upon known facts relating to the production of allergy, and upon the parallel fact that decadent people have morbidly sensitized protoplasm. Observation of the parallel fact led to the development of these notes.

During the process of digestion a number of poisons are always manufactured as the result of the microbes clamoring for part of the albuminoid food. Nature needs to grow her microbes as a regular feature in all gardens, of which man is one garden. The poisons in the normal man are commonly disposed of by previous agreement with nature, a compact entered into in good faith, and maintained if man does his part. Many poisons are taken to the liver,—a sewage disposal plant,—and are there treated in a scientific manner by nature, the great scientist, after the manner of sewage disposal plants constructed by an engineer. There are many smaller factories beside the liver in which microbe toxins are disposed of if man does his part according to nature's idea of the situation.

In connection with the subject of influence of microbic enemies in the alimentary tract, we have to remember that nothing but a single layer of epithelium stands between us and death. There is only one layer lining the alimentary tract and the tubular glands, and nothing else intervenes between the bacterial contents of the intestine and the blood and lymph circulation. So long as that layer of epithelium is intact, we are safe, but anything which lessens the efficiency of the protecting epithelial cells allows microbic toxins or the microbes themselves to extend freely into all of the paths through our city of cells.

Various ductless glands divide up the work of destroying the special toxins in the blood, and it is essential that each

one not only do its own work, but that all work together harmoniously, as the different parts of a factory must work systematically in order to turn out a finished product.

It remains for the gastro-enterologist to elaborate the influence of various closely allied bacilli. The ones which live upon ingested legumes have a very different influence from those which live upon ingested meat, although some of the influences are similar.

I know one man in whose case fear, headache, apprehension, cold feet, sensitiveness to sound, constipation, despair, are all present at times when capsulated bacilli abound in the colon. He could easily enough commit suicide. His temperament of conditions and penalties is greatly intensified at such times. The gastro-enterologist rather than the psychiatrist is the one in best position to make a first report in cases of this sort. The reason why the gastro-enterologist has not preceded the psychiatrist up to the present time is the reason why wireless messages were not sent until recent times. The gastro-enterologist had not reached the latter point, we had not reached the former point.

The pernicious anemias belong to the so-called secondary group. "Secondary" often refers to microbes as primary in causal relation. If we take for example such a pernicious anemia as the one which is dependent upon the colon bacillus, it may be quite possible to vaccinate against an anemia when we are dealing with a bacillus so amenable to cultivation as the colon bacillus.

Nature purposely led the pathologist astray at first. She touched him on the arm and said: "See, the colon bacillus is a useful saprophyte," then laughed and went on with her duty of poisoning off weaklings with the colon bacillus as a parasite, while the pathologist was looking the other way, and making no interference.

Perhaps the colon bacillus is symbiotic in normal quantities. Experiments with chickens have been made which seem to prove this to be true. If a certain small quantity of toxin of a symbiotic bacterium stimulates cell action to a degree intended by nature, it is useful, just as at dinner or at breakfast a cup of tea or a cup of coffee is useful, but tea and coffee in excess produce toxic effects. The caffein of tea or coffee when accepted generally by the whole civilized world, probably means that it is useful in moderate quantities, and the fact even suggests that perhaps these stimuli overcome some of the depressing effects of bacteria common to all civilized people.

When the foot is irritated by gout, the brain is irritated in the same way, with the same poison, but the irritated foot enlists sympathy, while the irritated brain does not.

Why does the old dog become cross? The fact that he often has rheumatism gives us the clue. The same toxin which irritates his joints irritates his brain. Man unconsciously changes the habits of his domestic animals in such a way as to lessen their resistance to microbes, because they acquire his bad habits. The animal's cells are then poisoned by toxins like the cells of the owner. The microbe owns dog and master.

It has never been known why mankind in general desires tea, coffee, alcohol, and tobacco, throughout the world. The fact has been a sort of mystery because other animals have no such desires. One line of thought opens a vista to the idea that it may be in proportion to microbic influence that man has need for these stimulants. It is not unlikely that they offset certain injurious effects of microbes.

Man is the only animal capable of persistently bringing about his own misery and his own destruction. He does this through the agency of his intelligence, indicating that nature in the course of evolution could not control man beyond

certain limitations. God is helpless in a way, unless we look at the matter in a large perspective and say that man brings about this misery and destruction in a grand evolution plan, working toward the time when a chosen nation will be developed. Nature sets people at worrying and killing themselves off in such a systematic way that it looks like a natural plan. One method by which man worries himself and kills himself off is by developing habits of life which allow the microbe to take charge of his health, and his mental processes. Certain of these discomforting effects of microbe poisoning seem to be overcome by the influence of tea, coffee, alcohol and tobacco, and we observe that people who are most actively pursued by microbes are the very ones who use in excess some one or more of these stimulants. It was observation of this latter fact that gave a clue to what seemed the real reason for the general use of these stimulants in moderate quantities. Various physiologists have been trying to find a solution for the question, but it seems very clear if we reason backward from known cases of excessive microbe poisoning, and simultaneous craving for these stimulants in excess. Most of us really need these comforts in moderate quantities, although each one of the stimulants is a poison to a certain degree. It seems to be a case of meeting poison with poison.

Shall we use tea, coffee, tobacco and alcohol? Yes, but not before adult life. One may use them in order to be sociable, and to get the comfort which they all bring. The neurotic will go on to excessive use of cigarettes or of alcohol, thereby hastening the speed downhill of a constitution going downhill already. The one who uses tea, coffee, tobacco and alcohol to excess helps to eliminate the unfit, and leaves the world in better order for the fit. One may properly give a pleasant flavor to life with a modicum of tea, coffee, tobacco and alcohol.

The question of license or no-license in regard to alcoholic beverages is easily enough settled on moral grounds at the present time; but not on expediency grounds at the present time. The chief objection to prohibition is found in the idea that it limits the freedom of the individual. The drunkard, however, limits the freedom of his wife and children, and of other people, consequently the freedom question does not remain in the problem. On practical grounds, alcohol adds to the comfort and sociability of so many people, when used in moderation, that legislators prefer restriction of sale, rather than prohibition of sale, as a rule in this country. The fundamental question relates to the responsibility of the individual in his use of the beverages. When the state raises individuals all of whom are responsible in this regard, no restriction of sale will be necessary. In the meantime, absolute prohibition of sale is the least complicated resource,—and well-managed restriction the most beneficial course. Incidentally, it is notable that the use of alcohol in excess occurs in countries where certain temperaments prevail. In some countries where every one who pleases to do so may sell alcoholic beverages like groceries, very little drunkenness is observed,—much less than one sees in certain prohibition states in this country. I have lived for months in European countries where even little children were free to buy liquors if they wished to do so, without seeing a single intoxicated individual.

Even in acute cases of microbic attack,—when a man is catching cold, for instance,—a hot whiskey is definitely valuable in overcoming part of the microbic influence. One who is sleepless because of colon bacillus influence may take a drink of coffee at bed time and go to sleep, whereas a healthy individual taking a drink of coffee at bed time is usually kept awake. In the former case, coffee certainly overcomes the known bacterial influence. As a rule, the most uncomfortable

class of people whom we meet,—the ones who put others in a state of unrest,—are the ones who boast that they have never touched tea, coffee, alcohol or tobacco. A very few individuals are so supremely healthy that they do not really care for any of these stimulants, but the majority of people who go without them because of some theory, are uncomfortable and make others uncomfortable. They are unaware of the fact that while refusing the comforting poisons, they are being irritated, and are irritating others through the influence of their microbe poisons. They call it successful effort of the will (this avoidance of the use of any stimulants), but the character of the success is very often questioned by their friends. Any man who is in a state of high tension all day long in business has lost some control over his digestive apparatus. He suffers at night from the unrest that goes with microbic and waste-product irritation, and yet a fragrant cigar or a comforting pipe might place him in a state of ease and allow him to be better company during the evening and better prepared for his work next day. It is a desirable trait and at the same time indicative of high character if one avoids the use of stimulants for which he has no need, or if he avoids excessive use of any one at any time. It is an undesirable trait,—a silly will stunt,—if one simply makes himself and others uncomfortable for lack of a little cheering tea, coffee, alcohol or tobacco which he may need on occasion.

Worry and anxiety raise blood pressure like other stimulants. As a result of raised blood pressure, there is often loss of sleep and proper cell nutrition. If the nerve cells are not properly nourished, nervous prostration follows, and we then have a depressive reaction with neurotic low blood pressure. Disappointment, grief, anger, strong dissatisfaction, all these raise blood pressure and interfere with the normal action of the protective organs against bacteria. Microbes in turn

furnish toxins which intensify the habit,—and the tendency to disappointment, grief and anger is increased. The vicious circle which is established may begin at either end of the original semicircle, and this is an important fact to know.

Cases of high blood pressure occurring with cerebral lesions, or due to the character of secondary changes in various organs, we understand pretty well. The most interesting group to be studied in the future will consist of those cases in which there is allergic over-stimulation of the vaso-constrictor nerves, by toxins which directly sensitize the blood vascular system, or which make it vulnerable to the influence of epinephrin. A number of toxins apparently have the effect of thus increasing peripheral resistance. The blood is obliged to accumulate upon the arterial side until an increased degree of elastic recoil of the arterial side is required for forcing blood through the peripheral capillaries. Cases of high blood pressure which I take to belong among the allergic manifestations are increasing rapidly under the conditions of modern civilization. A search for the specific protein poison in any given case will constitute a most interesting feature of our medical practice of the future. This future cannot be far away, because so many men are even now ready to launch themselves into the great new field that has been opened for a higher quality of medical practice, and a greater quantity of medical practice, than the world has ever seen previously.

We have barely advanced to the point of associating the idea of microbic injury with cases in which heat energy is liberated from cells through forcible breaking up of their mass (fevers). We are shortly to move forward to a recognition of the fact that profound effects may follow liberation of energy belonging to the cells in the course of new chemical combinations, but without allowing any notable amount of heat energy to escape (psychoses for instance).

The extent to which one can worry is often limited by the amount of food which he can digest. One individual who does not digest much, quickly worries up to the limit of his strength. Another who is capable of digesting very much more, may be enabled to worry very much more, over the same questions, because he can turn more potential into the form of worry, if that is his tendency.

Worry represents the stage of intoxication of a valuable attribute, dissatisfaction, which nature gave people in order to keep them evoluting toward better things. When alcohol or microbe toxins cause an exaggerated dissatisfaction in the form of worry, the individual has arrived at the point of intoxication where injury begins, and a vicious circle ensues,—worry causing more worry, for reasons chemical.

So long as we know the nature of the influences of the microbe in human affairs, the mere "knowing why" is a comfort, even when we cannot avoid trouble. On a rainy day if we are depressed, we may still laugh, saying that the depression is only due to relaxation of capillaries because of lessened atmospheric pressure. With relaxed capillaries under lessened atmospheric pressure it is a trifle more difficult to use the mind clearly, or even to do normal physical work. If we simply know that fact we are annoyed, but laugh and wait for the wind to change back to the north. If we do not know why we are depressed and our thoughts turn to the idea that luck is against us, or we are not loved as much as we ought to be, or if impending troubles loom up, we can laugh on the rainiest day, simply saying, "Oh, that is due to relaxation of walls of capillaries on a low barometer, and they will tune up all right when the wind comes out of the north to-morrow."

We do not know to what extent the action of toxins from bacteria is direct, like the toxin of alcohol, or to what degree there is special sensitization of protoplasm by bacterial toxins.

Many toxins have little effect, while others bring out a tremendous response. Then again, immunity can be produced against the causes of allergy systematically, in an experimental way. Perhaps immunity occurs in nature in the same way. Some individuals make exaggerated response to a certain toxin, while others make no response at all to the same toxin.

When speaking of allergy we refer to a condition of cell protoplasm due to preliminary sensitization by a small dose of protein substance, followed by a condition of hyper-susceptibility on the part of the organism. In cases of idiosyncrasy to drugs we are dealing chiefly with known chemical substances, but substances which are more or less toxic under ordinary circumstances. Recent evidence seems to show that a close relationship exists between drug idiosyncrasy and protein allergy. If the two responses are not quite identical, we can at any rate, for practical purposes, classify microbic agents which are known to be proteins, along with other idiosyncrasy agents, and call allergy "idiosyncrasy," if we wish;—a special kind of idiosyncrasy. An individual who has been sensitized to certain proteins may be brought to a condition of immunity by gradual systematic application of doses, beginning with very small doses, and gradually increasing them to large ones. The same thing may be done with drugs in relation to idiosyncrasy. The work of Charrot in relation to allergic phenomena has achieved immunization to such an extent that we may speculate on an entirely new vista of colonic poisoning, if we can find for instance which bacteria are producing the chronic poisoning. Who knows but we may be enabled to vaccinate a patient some day against melancholia, eczema, or ulcer of the stomach? The idea belongs among the possibilities. Some years ago I had occasion to come in contact with a man who was melancholic at times, but one of the finest characters I have ever known. Generous, thoughtful for others, of high

ideals, courageous, and with a spiritual type of nature, he had an inherited tendency toward sensitization by bacterial toxins. Under their influence he finally became an extremely troublesome character in the community. Melancholia deserves as much sympathy as does tuberculosis, but does not get it. The elative features of tuberculosis often endear the patient to all who are about him, and the tuberculosis patient is surrounded by admiring, sympathetic friends. The melancholiac, on the other hand, who deserves quite as much sympathy, does not get it because his depressive features arouse animosity in other individuals, and he is shunned excepting by friends of large understanding and of more transcendental kindness than is ever drawn out by the tuberculous patient. I confess to more or less failure to give free sympathy to the melancholiac even with my knowledge of the subject, and with my understanding of some beautiful character that is obscured from ordinary view through the influence of colonic toxins.

We obtain allergy in many ways from bacteria, from their by-products, or from the contents of their bodies when freed by their death. In addition we have poison from body cells, induced by the presence of microbe toxins. So-called idiosyncrasy to a drug belongs in this same group, and relates to response of the chemistry of the individual to the chemistry incited Idiosyncrasy of one individual toward another individual is still chemistry, and this may be either physiologic or pathologic in degree. When people have idiosyncrasy to some common article of food like milk, I assume that it means idiosyncrasy relating to special bacteria in milk. The colon bacillus being the dominating bacterium in milk as a rule, I note that people who have idiosyncrasy to milk seem to be those who have an excess of colon bacilli in the bowel anyway. Idiosyncrasy to milk in such case represents allergy. I have

heard physicians say to patients who showed repugnance to milk, "Oh, nonsense, that is all in your mind. Milk is a good food, and there is nothing in it to hurt you." They were wrong. Through an effort of the will the patient might continue to take milk, but at too great a cost. If there is anything we do not like in the way of food or drink we must consider the matter from a basis of the assumption that it really may not be good for us, and that repugnance may represent allergy, although this can be overcome if managed rightly.

Some allergic demonstrations we know are due to toxins developed and set free in the course of destruction of microbes by other microbes. The poisons from destroyed bacteria are proteins, like the ones formed from body cells in response to action of microbes. The toxins all act as foreign bodies, which irritate or exert destructive influences upon normal cells.

Allergy and idiosyncrasy to drugs being closely allied, sensitization of protoplasm may be made by caffein, nicotine, morphine, or alcohol, in much the same way as it is done by microbe toxins. The nervousness manifested as a result of over-influence of all of these substances simply means the sand between helium blocks of protoplasm, and acquired instability of cell structure.

If one wishes to experiment with a high degree of sensitization he can take small doses of strychnine in succession until there is some tendency to high-stepping when he walks. When he is in this condition the fall of an object upon the floor will give him a painful start. An unkind word will bring out an exaggerated response. The strychnine experiment will do no harm and places one in a position to sympathize with others who are constantly over-sensitized by microbe toxin. This takes sympathy to the laboratory.

In order to be impressed by the character of influence of foreign proteins in the circulation, one may remember that

1/20 of 1/1,000,000 of a gram of injected egg protein will sensitize a guinea pig so that a second injection produces distinct symptoms allergically, while 1/50,000 of a cubic centimeter of solution containing 1/1,000,000 of a gram of protein sensitizes the same guinea pig fatally. In other words, if one grain of egg white is divided into 66,600 equal parts, one of these parts is as fatal to a guinea pig as a bullet through his heart, after a preliminary sensitization.

In general, the proteins of one organism are poisonous to the proteins of another organism. According to Eccles, in an article entitled "A Darwinian Interpretation of Anaphylaxis," *Medical Record*, August 12, 1911, the whole digestive system of animals has been built up to form protection against proteins which we require as food, and which would poison us if introduced directly into the circulation. When the protein substance from the interior of bacteria is freed in the circulation it produces an effect similar to the injection of white of egg directly into the circulation,—which under these circumstances is a violent poison if a previous dose of white of egg has sensitized the protoplasm of an individual. Microbe toxins absorbed from the bowel and improperly metabolized seem to have the same allergic effect. In plant life we can readily understand the possibility of cell injury through allergy when symbiotic bacteria are destroyed by other bacteria under conditions of cultivation which favor the latter. The protein products of the symbiotic bacteria then entering the sap of the plant, might influence the protoplasm in such a way as to injure its cells by a process of allergy.

In the laboratory we can sensitize the protoplasm of a rabbit with repeated small doses of a toxic substance,—strychnine, to the point where such exaggerated response to external impression occurs that a bright light or loud sound will throw the rabbit into convulsions. If we continue to disturb the

rabbit at short intervals by blowing upon it, we can carry it almost to the point of death. The same thing goes on to some degree with people under modern industrial conditions, in an insidious way. Bacterial toxins which are developed under our present methods of living may sensitize the protoplasm of individuals very much as protoplasm of a rabbit is sensitized with strychnine.

The asthmatic is like the rabbit sensitized with strychnine, and which has muscular spasm and convulsions when blown upon. The protoplasm of the asthmatic has been sensitized to a point of delicate equilibrium. Any one of a number of causes may precipitate bronchial muscle spasm. Asthmatic sensitization is microbic in origin as we now look at the question. In the same way a gouty patient has an attack so quickly at times, in connection with some article of food or some exposure to the weather, that we do not realize the microbic connection. The patient is clearly allergic to some toxin and we assume that microbe toxins have sensitized his protoplasm up to such a delicate balance that perhaps a single radical from a trifling excess of acid upsets the chemistry that had been maintained in the presence of indol, skatol and phenol.

Even the ordinary ups and downs of sensitized people may represent alternating stimulative and depressive stages of microbe influence. Whether it is always direct microbe influence or not one cannot state at the present time. We can only state that microbes are always a factor in some part of the metabolism of every living man. Their toxins are getting to be known as the chief stimulating or depressing agents in acute and chronic illness.

Many people who suffer great distress from little daily annoyances,—what are called "pin prick upsets,"—have had their protoplasm sensitized by toxins of intestinal bacteria; sometimes by one species, sometimes by another species. The

acceptance of personal offence means an expression of personal limitation of judicial faculty.

States of the mind depend upon states of the brain cells. States of the brain cells depend upon states of metabolism. States of metabolism depend upon microbic influence. States of microbic influence vary with the degree of microbic influence in relation to protective organs.

The reason why we may assume that bacteria produce so many kinds of special sensitization of protein, is because the products of so many microbes are foreign to normal metabolic processes. In nutritional processes from normal products of the alimentary tract, proteins are speedily and safely metabolized (including protein products from intestinal bacteria), but when a protein or sensitizing antigen is injected directly into the tissues of the body, it seems to induce the formation of an antibody which has properties of an enzyme. When reinjection of the protein is made, it becomes digested by the proteolytic antibody, and the digestive reaction seems then to give rise to chemical products which are the toxic agents. We may state an example briefly by saying that a man is allergic to the colon bacillus, meaning that protein products of his colon bacilli have set in motion the processes ending in formation of toxic agents. The colon bacillus in normal proportion and confined to the colon may be a useful bacterium. It may even be symbiotic and necessary. It is only when the mode of life of an individual allows of excess of development of the colon bacillus that it acts in another capacity, and shows a morbid sensitizing function relating to protoplasm. Very many bacteria are abnormally at work in tissues and fluids outside of the alimentary tract, within which tract their products would be subjected to normal digestive and metabolic processes. We may find the colon bacillus for instance outside of the alimentary tract in adhesion tissue surrounding

the pylorus. We find it in all sorts of places outside of the alimentary tract, and the protein products of these bacteria we assume are often turned directly into the blood circulation, the result being similar to the injection of a protein or sensitizing antigen directly into the circulation, as we do it experimentally in studying serum sickness.

All people who work intellectually, without taking sufficient physical exercise to keep their protective organs fortified against colon microbes, become so highly sensitized that they respond abnormally to wave lengths belonging to noises and to sights, and become what is called highly nervous. If all of their protoplasm is habitually sensitized abnormally, the impulse may be transmitted to their progeny. The first duty of every man engaged in intellectual work, if he wishes his work to ring true in its effect upon himself, upon society, and upon his progeny, is to oxidize his toxins and attend to their elimination by proper degree of exercise. At one time when at college I was eagerly and laboriously reading Hegel. The men who were engaged in military drill and the ball players appeared to be men who were missing wonderful opportunity and losing valuable time, simply carrying on life as inferior beings from day to day. Later experience leads me to believe that the men who were playing ball and taking military drill were in the end preparing themselves and their minds quite as well as the one who was reading Hegel instead of exercising at that time.

It will probably be a decade or so from the present time before we shall isolate and cultivate separate species of colonic bacteria, and find that toxins of each species when employed experimentally will produce characteristic illness belonging to their respective activities. Thus, we may cultivate one species and secure a toxin which will produce chronic articular rheumatism; a second species may cause arthritis deformans;

a third may cause psoriasis; a fourth may cause eczema; a fifth may cause exophthalmic goitre; a sixth may cause lumbago; a seventh may cause trigeminal neuralgia; an eighth may cause dementia præcox; a ninth may cause melancholia; and so on through a long list. Medical history is after all nothing but natural history, and various diseases represent results only of life histories of bacteria, when we consider the question of conditions fundamentally and as a whole. At the present time with our crude methods in medicine, even when making a flock shot at the colonic bacteria, we note remarkable results; and the numerous laxatives and cathartics are an outcome of this observation. At the present time we do not use them with any high degree of intelligence, but the time is coming when we shall make a rifle shot at the heart of a particular species of bacterium. Further than that, we shall take away its food. We shall find the particular protein which it splits up into troublesome poisons for any particular host. Just as a hunter now learns the feeding habit of game, and acquires methods for securing his game, in the same way the physician of the future will deal with the feeding habits of specific microbes of various diseases. Having found that a given microbe is influential in producing a given disease, we already know that we may produce immunity against the influence of that microbe through employment of our antitoxins or allied resources. All this sounds very complex, but it is to be a feature of twentieth century medicine, and the need for this development of medicine will be felt more and more. We exercise less and less natural control over development of poisons that nature is asking the microbe to use against us, for the purpose of limiting population. This places the physician in the position of "working against the will of God," unless we assume that it is His will to place this opposing influence of physician against the influence of microbe in order to give

a more highly developed human being, as a product of the struggle between two opposing forces. This, to my mind, seems the logical deduction to be sought, because by analogy it corresponds with the result of all other expenditures of force in nature.

For people who suffer from the continued influence of toxins from the colon I would coin the word "colonics," to represent a parallel to what we understand when speaking of those who use alcoholic stimulants as "alcoholics."

If we compare an individual who is poisoned by toxin from the colon with one who is drunk from toxin of saccharomyces (alcohol) we may note a similarity. The alcohol drunkard is elated in the early stages and destructive in the last stages of a debauch. The colon drunkard may be spurred to remarkable activity at the outset of an attack of poisoning, and reaches a condition of lassitude later, but is apt to be depressing in mental attitude from first to last. Any discharge of mental energy from the colon drunkard is apt to injure what it strikes. The saccharomyces drunkard and the colon drunkard during the stage of excited activity have their natural qualifications intensified. If it is a writer, he is prone to write things which are destructive at all times, if he is a colon drunkard; but if a saccharomyces drunkard he may write most elatively during part of the course of his stimulation. The saccharomyces drunkard if a painter is very apt to use a good deal of red in his color scheme, because the long stimulating ether rays appeal to him in the stage of excitation. The colon drunkard is apt to respond to short ether waves if he is a painter, and to give us a good many blues and violets, because his deepest feeling is associated with the short ether waves, their sedative chemical effect upon the retina being greater than that of long waves. The ether waves which appeal to individuals may be expressed

in a whole nation if it comprises a large proportion of people responding to any one set of waves. For instances, the Spanish flag is red and yellow, proud conquering colors, but Finnish colors express in blue and white a more or less dreamy and melancholy national tendency. In France and in America we have red, white and blue, indicating a combination of responses in nations which have no characteristic either for conquest or for dreaming.

The colonic may have a nature full of tenderness, pity, kindness, justice, generosity, love for truth and beauty, in fact all of the higher attributes which may also belong to a saccharomyces drunkard of the periodic type. Both represent objects for deep sympathy. The colonic physically may develop hard arteries and a hard liver, just as the saccharomyces drunkard may develop hard arteries and a hard liver.

Misconception belongs to the influence of the colon bacillus group of toxins rather than to the tubercle bacillus group. A mind under the influence of various toxins from the colon has a tendency to form misconceptions many times in the course of a day because of toxic injury to the physical brain cells of the individual. Misconception like other features of the human mind is mechanistic in its origin and interferes with the smooth running of the mind quite as much as any machinery is interfered with when cogs are out of order.

The colonic sometimes has to sit up in bed at night with open windows in a hunger for oxygen to oxidize the cruel toxins that are burning his fevered head. He thinks that people irritate him purposely because he cannot believe any such degree of irritation could occur unless it was given direction for a purpose, in order to be so effective. The colonic is prone to make false accusations, based upon fear of what may happen, and false accusations bring prompt and violent response from people who are their victims, and who

are untrained or ignorant of the true cause for the false accusations aimed at them. Young lives may be blasted forever in a family by the influence of a colonic parent who is given to making false accusations,—yet not responsible for the misconceptions leading to the accusations.

When we speak of the difficulty of living with a colonic companion being as great as that of living with an alcoholic companion, we are speaking of practically the same sort of thing but employing other terms. Toxin from the colon is not different from alcohol or from opium, if we are to place it on a simple basis of classification as "a drug." There are, to be sure, great variations in degree and intensity of action of all these drugs, alcohol, colonic toxin, or morphine, but in order to grasp the subject in a comprehensive way, we must consider them as all standing in the same general relationship to protoplasm of the individual. The alcoholic or the one who uses morphine may be quite normal at times, and the colonic may be quite normal at times. Even when more or less under the influence of any one of these drugs, the victim may have more or less good control temporarily, but which cannot be maintained at all times. Thus, the man who is quite intoxicated may steady himself awhile in order to complete a business transaction. The colonic may be pleasant and agreeable to strangers, using the positive note in conversation, yet dropping back to a "normal level of morbidity" when in the presence of those for whom special effort of the will is not required, and of whom he is not afraid.

One might have more comfort in living with a companion who is alcoholic than with one who suffers from intestinal stasis, because, as the result of persistent toxic impression, these people have protoplasm which is negatively charged. They are always complaining, misunderstanding and finding everything wrong, for they are never quite their natural selves.

In divorce cases which have come under my observation the chief trouble has been so often due to consequences of defects in the ductless glands, that it seems to me every judge should be familiar with the book of Sajous in order to approach the subject from the right direction.

We often find a case in which the whole thought of a wife or of a husband, and their wholesome ambition, is to have a delightful home, with little desire for any other companionship excepting that of each other and of the children, yet their protoplasm may be sensitized in such a way as to make their ideal impossible of realization. This tendency will increase under conditions of higher civilization. The question is not to be met by the clergyman or by the judge, but by the physiologist and by the psychologist.

The wife of a colonic begs the doctor for help. "What can I do?" she asks. "My husband in his attacks of irritability asks me to leave the room because I make him so nervous. When I obey, and start to leave the room, he says that it is cruel for me to go away and leave him alone in that condition. When I talk with him he says that I choose subjects which are particularly irritating, no matter what the subject is, or how carefully I try to avoid anything of the sort. On the other hand, if I remain silent he says that my silence is irritating, he cannot bear it. He has such a fine character and such noble traits that I must do everything possible for him, but he takes my time and thoughts wholly away from my art work, and I am distracted thinking of him all day long when my thoughts should be on my work, which requires the nicest sort of balance. At the times when he is most nervous he finds fault with all of my friends, and they keep away from us entirely, so I cannot get a proper income from my work. Two or three friends remain very close to him, and he tells them in confidence all of the things which I do to irritate him,

and how I neglect him, although he asks them not to tell. They do tell, however, and the word goes around."

"He is so brave that when he has a terrible sick headache he does not even speak of it. No one but I can really know how much he suffers. Consequently it is the joy of duty that keeps me by his side, for I know that no one else would be patient with him. What he says to my friends I know to be misconception due to his illness. What does it matter then if I have fallen from a pedestal for them, and am so different from what they thought me when their original estimates were made? He does his very best all the while, and would like nothing better than to see me really on a pedestal. That idea is always in his heart, and he has deep and real sorrow at what he considers to be my failings. He has voluntarily tried the mind cures, and has a whole scrapbook full of the most heartening quotations. I could love him for his scrapbook alone. There is no honesty clearer than his, no singleheartedness more genuine, no taste more cultivated. Please, dear doctor, tell me that you know how to make him well." This sort of appeal is one to make the physician desert the idea of any financial return from his profession, and to throw himself into the study of methods for relieving. Such methods are really just now beginning to show above the horizon. We shall probably be able to vaccinate against colonic influences.

No great degree of associative faculty is needed in order to observe a similarity in the toxic delusions and hallucinations of typhoid fever, of opium influence, and of puerperal insanity, and it is but a short step from puerperal insanity to the allied insanities. Misconception is only one step away from delusion.

One of the best marked colonics whom I have known had a daughter wholly optimistic at all times, and a son who was extremely pessimistic only at times when the colon was out of order, optimistic at other times. This shows that it is not

a mental tendency to depression which is hereditary, but rather a physical tendency which allows certain microbes to develop in excess. One case of a colonic comes to mind in which I followed her course for many years during various stages. A brilliant, cultivated, highly educated and beautiful woman, married to a scholar of international reputation. Shortly after their marriage she developed stigmata of decadence in two or three organs, and about the same time began to develop localized edemas, small neurœdemas of toxic origin at a time when colonic disturbance developed. The people had a beautiful home, social prestige, and were in every way fitted to grace the highest circles in civilization, but the wife began to have points of view, toxic in origin, which rendered the home a distressing place and which drove away their friends. Her points of view made her husband a constant object of attack, and threatened him with loss of position in which he could earn an income. Her statements were believed by a certain group of her acquaintances because she was so strongly impressed with the correctness of what was misconception that she carried conviction. Other people having a healthy inherent sense of truth in the matter were not influenced much. Here was a case in which an enormous amount of distress and misery were based upon colonic microbe action.

In this case, what a pity it was, if the victim had to suffer from bacterial influence, that it was not the tubercle bacillus rather than the colon bacillus which sensitized her protoplasm. A glad microbe instead of a sad microbe, if she was doomed by inheritance to be vulnerable to some one of the bacteria.

Parents who drive their children away from home, or husbands and wives who seek other companionship, are often to be pitied rather than blamed, for there is nothing so good as the home. One may often trace a toxic history to parents or grandparents in cases of this sort.

We may have good as well as deleterious influence of harmful bacteria. A man may be led to do better and nobler things through the influence of the mind of a tuberculous wife, or he may be driven to desperation by the toxins of colon bacilli of his wife. We now have laboratory tests which allow us to predicate any such possibility or probability if the proper examination is made.

Children have often left homes, and families have become separated, because of a father or mother poisoned by bacteria, in cases in which the parents were really to be honored and the discord was not their fault at all,—but no one knew that, for the question of colon or of teeth never came up.

One reason why we have not noted the effect of bacterial poisons upon the organism so readily as we have noted the influence of saccharomyces toxin is because alcohol taken in large single doses produces prompt effects,—while doses of toxins of bacteria are "secretly" administered little by little for long periods of certain time.

There is many a ruined home in the world because a colonic with the brilliancy of a meteor has struck it with destructive force, and ruined everything in his or her path.

The habit for stimulation in the colonic is quite as marked as the habit for stimulation in the saccharomyces drunkard. With the colonic there is a desire to worry up to the limit of one's physical strength, and in order to be in comparative comfort, the colonic must find abundant causes for worry. When he is surrounded by blessings in such a way that he can hardly escape comfort without difficulty, he becomes very miserable.

The colonic who is compelled to discharge energy in the form of worry seeks first one cause for worry and then another. Sometimes when among surroundings of comfort he finds it extremely difficult to get a real cause for worry, but

his mind is restless and uneasy until he has found this stimulation. He then has temporary relief from the restlessness. He worries until he has found cause for new worry.

If a man beats his wife, the brutal act may be due to inherent qualities without reference to microbes. It may be due to saccharomyces toxins, it may be due to colon bacillus toxin, and the brutality not only may be but often definitely is, due to such illness. The man intoxicated with saccharomyces toxin or poisoned with colon bacillus toxin is an ill man, and is to be considered as such when his testimony is to be weighed in court. The ducking stool which was used for the correction of brutal scolders among women should not have been used until a report had been made upon the bacteriology of the colon, and upon the relative positions of abdominal and pelvic organs of the victim,—or a still more elaborate report upon the true nature of the whole case. The method of simply ducking a scolding woman was meeting pathologic brutality with normal brutality.

One of my acquaintances, a physician, said, "You are perfectly right about microbic influence in my own case. It does not help my divorce question, excepting that Jess and I are on better terms in a general way, because we now understand why we could not get along together. As a matter of fact, we cannot, and there is no use in talking about it, but instead of our being rank with each other, we are now quite friendly after getting your ideas, and I am going to frame up some sort of a chance for her to get a divorce. Three or four years ago in the course of an attack of indigestion I had an examination made, and know that I have a lot of colonic anerobes and other things in excess all the time, and I know that they make me ugly at times when they do not move along fast enough, but I never connected that part with the family troubles until I began to think about your idea. It has not

helped matters any so far as the result goes finally, excepting that we understand better."

A neurotic husband may be exasperated almost to the point of fury if he fails to arouse a placid wife to the point of making response to his attacks. (I knew of one such case.) This is because his nature demands fight for stimulative purposes. Fight for the neurotic is similar to a drink of alcohol for the inebriate. We may excuse his disposition if we simply know that his irritability is due to toxins. One will have infinite compassion for others when he knows enough of psychology, and of the influence of microbes on psychology, and of the influence of decadent organs in allowing microbes to influence psychology.

The colonic sometimes tries first in one way and then in another way to get an irritated response to an irritating question or assertion. When the response comes, there is satisfaction resulting from a discharge of tension. The colonic eventually brings upon himself almost any calamity that he fears, through the influence of persistent suggestion.

The colon bacillus may be called the microbe of negation, while the tubercle bacillus is the microbe of affirmation. Anxiety psychoses belong to the colon bacillus group.

Conversation of the colon bacillus victim is negative in character generally. If one wishes to know if he is an allergist responding to the colon bacillus, a little notebook carried in his pocket for a day may tell. One can check up the proportion of his negatives—"don't, ought not, cannot, should not, etc." The relative proportion of negatives which he employs during the day will give a key to the second group of sequences, that unhappy response which is customarily made to negative suggestion by acquaintances, by friends, and by all. When with the aid of a notebook we find the negative predominating in our conversation, or even making any important part of our

conversation, it is a sign that one should consult a gastro-enterologist and obtain a report. He can then more readily place himself in social adjustment, because of clearer knowledge relating to the bacteria which have recorded their influence upon him with results tabulated in his notebook. The perfectly healthy mind is normally positive in man and in the red squirrel. Many a man can never learn the reason for lack of success in his undertakings until with the aid of a notebook he checks off the proportion of negative speeches that he makes during the day, and finds that he is only a Punch and Judy show at the hands of his microbes.

An employer who is observant learns the difference between the positive and negative note when addressing his or her employees. The negative note usually makes trouble, and misses its object. The positive note may make trouble, but accomplishes its object. This may be set down as a fairly good rule. The reason is because there is a natural tendency on the part of employees to do the best they can. One may take the question home to himself. If you are plied with the negative note by any one, you are not inspired to respond with good work. If you are stimulated by the positive note, you may make an effort beyond your strength in an effort to please.

The colonic often fills the house and the office with inspiring printed mottoes, and then travels along the branch which he has constructed like a sloth, back downward, not leaping gladly along the top of the branch like a red squirrel.

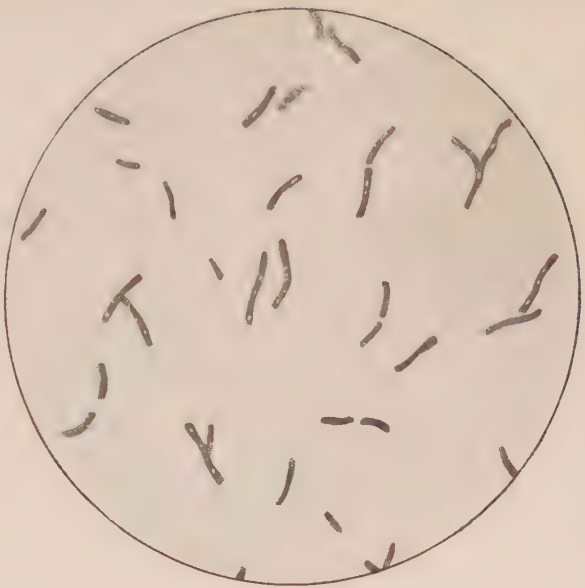
The colon bacillus or some of the anerobes take their trick at the wheel chiefly during occasions of colonic stasis. When kept moving as a mob they do little harm, but when allowed to assemble they take charge of the ship.

The fate of many a great question in politics, literature, and of state, has occurred during the microbe watch, when the colon bacillus or anerobe had its hand on the wheel. When

the wind blows from the west in London there is a low barometer, congestion of liver capillaries follows, and while the capillaries are unable to do their work properly, unmetabolized toxins cause the signing of gouty papers. The west wind has caused many complications and disasters that the east wind would have spared that nation. Tremendous impressions have been made upon history through the steering done by bacteria during a microbe watch.

One may note insidious bacterial influence clearly if he is naturally strong and well but has a sudden attack of some infection like the grip. There is at first a stimulating effect from toxin of the grip microbe. This is shown in increased activity of muscle action and of brain action. One is restless, makes a great many unnecessary movements, and takes up more projects for the day than he can well manage. Then comes the depressing effect. The mind pictures various dangers and calamities. There is apprehension. Misdeeds of others are dwelt upon. The vicissitudes of financial conditions are preeminently considered in a repetitious way, at various times during the day. This tendency to repetitious consideration of irritating influences is a feature of the depressive stage. If there is opportunity to choose between pleasant thoughts and disagreeable ones, disagreeable thoughts are chosen by preference. Instead of settling questions for the day rapidly, with one passing thought for each, in the customary way of a well man of affairs, irritating questions are dwelt upon and turned over and over in mind,—not settled, but used to the exclusion of useful and pleasant thoughts. The microbe has in fact limited freedom of the will and distinctly directs one's mode of thought and of action. Any one understanding the subject from a microbic basis can say to himself, "Ha! old grip microbe, I know you! I suppose you will keep me in this condition for awhile, but you cannot deceive me. I will

COLON BACILLUS



TUBERCLE BACILLUS

The two chief microbic agents influencing the health and mind of man so far as we know at the present moment. Certain esoteric healers teach us that all illness is caused by error. We raise these little errors by the quart in the laboratory. We give error to animals experimentally and cure them of error by means of our modern resources.

have to be depressed and think of all sorts of disagreeable things for a few days, but I can get the better of you in one respect; I will not be disagreeable toward other people in accordance with your direction, but will bear the disturbance valiantly all alone until I can get rid of you." There is much of fun and interest in an illness if its humorous phases are studied in sequence as they appear. I am amused at the persistence of the grip microbe in filling my own mind with disagreeable thoughts, during the course of one or more annual attacks.

Many skin diseases with various patterns and long names are simply smoke from colonic microbes below, and yet the specialist in skin diseases is commonly the last one to find this out in any given case. It is the general practitioner who has to keep nudging him toward the fact.

Because of its exposure to light the skin has such an affinity for foreign proteins and contains such sensitive reagents for products of colonic proteolysis, that we have many pretty patterns of skin lesions. These may be allergic phenomena. The evidence that we are only upon the verge of medical knowledge lies in the fact that very few men have even begun to translate the meaning of skin disease in its relation to allergy, and that translation will be far simpler than translation of symbols belonging to brain and nerve disturbances. When we arrive at the point of making warp and woof of knowledge in relation to allergy and skin lesions, it will make only a plain crash mat as compared with the elaborate Anatole rug of the mind and nerve question.

An indication of the elaborate nature of poisons is shown in allergy when we have preliminary sensitization of protein with a toxic substance like that occurring in shellfish and in strawberries. The patient may not only remain sensitive to this influence throughout life, but even the serum of an animal

whose protein had been sensitized in this way, renders a recipient of this serum sensitive.

Some people who would not show idiosyncrasy to one substance or to another substance may show idiosyncrasy when both are combined. Dr. Kast tells me of a patient who was intoxicated by a combination of coffee and cream, but who was not disturbed by either one separately. Such an instance shows how complicated our studies will become as we progress further into the subjects of allergy and idiosyncrasy.

The study of allergy apparently promises more for the social progress of this country than is promised by any other study, because we are given certain known factors in dissension. My idea is that knowledge of allergy is to be the glory of this century, as knowledge of electricity and magnetism were the glory of a century just passed.

The various healing cults demonstrate the influence of mind upon matter or upon physical processes. We recognize that fact. Now we are ready for the next step of demonstrating the influence of microbe upon mind. After working along that line of study for awhile, we shall be able to steer both mind and microbe along with the tide of knowledge and of the will, just as a helmsman steers his auxiliary boat which has sails above and a motor below.

In the normal individual, sensations which are streaming into consciousness from various organs continuously day and night play their respective parts in function without the knowledge of the individual, aside from his cenesthesia (ordinary consciousness of being, without reference to special-sense testimony). Cenesthesia is maintained with comfort in the presence of normal metabolic equilibrium.

When toxins occur in excess in the circulation of an individual, his metabolic equilibrium is upset and he then becomes conscious of a vague discomfort. There is a disturbed, or

even painful cenesthesia due to morbidly sensitized protoplasm, which leads the individual to seek relief through the aid of drugs like alcohol, morphine or cocaine. The nature of this attempt at getting comfort is now understood by physiologists, but they seem to have entirely overlooked another way in which people with discomforting cenesthesia (let us call them "Odynecens") seek relief, and which has an important sociologic bearing. This particular method of seeking relief is somewhat similar to the act of scratching or rubbing the skin when it has been irritated by nettles, for instance. Instead of scratching irritated protoplasm by a voluntary muscular effort, the odynecens employ a voluntary effort of the brain cells. They seek to irritate other people to the point of eliciting an expression of anger, and the angry response then scratches and soothes the over-sensitized protoplasm of the odynecens. Just as more and more scratching of a nettle-stung skin appears to be needed, so larger and larger doses of alcohol or morphine are required by the odynecen, and there is an increased craving for angry response from other people, until it becomes a habit.

We are not to consider that the question of odeynecens covers any large part of the ground of dissension. It simply plays a percentage part which we are to observe and recognize. Quite normal people of different temperaments cannot well take counsel from each other and cannot well see things from each other's point of view, because each temperament has its respective experiences. Experiences collected by one temperament might not interest another temperament at all. People say of an artist that "he sees everything through a temperament." How else can one see anything? An index to the degree of one's imagination rests in the ability of an individual to read script freely. A man of little imagination requires all of the letters in a word written plainly. A man with more imagination needs only one or two letters as keys to each word, and

a man with free flowing imagination easily reads an epistle in which one fairly well written letter to three or four words will suffice. We all see things through temperament, and I suppose that we are all artists in one way or another.

People often wonder how two partners in a business who are always in a row manage to keep together in partnership. As a matter of fact, they give each other a sort of morbid comfort, a certain degree of relief, by scratching each other's irritated protoplasm. If one of the partners finally does leave, the other one becomes lonesome and sometimes morose through lack of his daily row. When only one of the partners suffers from toxic over-stimulation of his protoplasm, the partnership is apt to be dissolved at an early stage, before large responsibilities are conjointly carried. I know of very capable and cultivated odynecens who have never been able to progress far in any one of their numerous partnership ventures, because the other partners had normal cenesthesia excepting when overworked or suffering from a cold or other transitory cause for toxic over-stimulation.

Neighbors often wonder how it is that a man and wife who are always quarreling manage to remain together. The situation may be the same as that with two odynecen business partners. If husband or wife is taken away, the grief and lonesomeness of the one who remains will be so deep and poignant that fullest sympathy should be accorded the survivor. If any third party tries to interfere between a warring husband and wife, let him beware! They will both turn upon the intruder, as a rule. If only one of the married couple happens to be an odynecen, the situation is again similar to that with two business partners. Early divorce or separation is the rule, although profit or pride may serve to keep a normal member in partnership or in wedlock with an odynecen. My idea is that it should be sympathy rather than profit or pride

which holds them together, and when we get to a full understanding of the influence of the microbe in producing odynecens, the world will suddenly enlarge its range of kindly sympathy in a most wholesome way toward unhappy partners and mates.

We almost never find odynecens among paired birds or lower animals of any sort. The condition goes with that higher intelligence which takes man into complicated social relationships at a time in our cultural period before we have adopted physical methods for securing thorough oxidization of toxins, and before we have learned to acquire methods of living which avoid the production of an excess of microbic toxins. The boy scouts, camp-fire girls, and newer agriculturists, will empirically lessen the number of warring business partners and marriage mates, but we shall get at the matter in a quite rational and systematic way before the end of the twentieth century. Odynecens represent that part of the public which is being defeated by the microbe. They are under-dogs in the fight, needing our sympathy and help. Their presence in the community explains one of perhaps four chief reasons for continuance of the social evil. *Homo sapiens* is probably a polygamous animal by nature, and has adopted monogamy as a matter of best social expediency, but microbic interference with his artificial plan has a tendency to throw people back to actions based upon primitive instincts.

An odynecen in the presence of a placid hearer impatiently tries one resource after another for obtaining solace which is craved, and cannot rest until some remark, impatient if not angry in character, is elicited. The appellation of "trouble hunter" has been given to these unfortunate people. In law-abiding communities they are free from danger of personal injury for the most part, but on the frontier they are apt to get shot. Odynecens largely make up that part of the com-

munity which furnishes a market for harrowing news, novels, and dramas. They include the chip-on-the-shoulder group.

People while looking for slights have slight minds. The more certain they are of personal inferiority, the more certain are they that other people are likely to give them their due.

Vulnerability to slights indicates a sensitiveness belonging to self consciousness which in turn realizes that its possessor is not devoted to the interests of other people in a broad free way.

Mind and matter seem to be distinctly retroactive one upon the other in all relations of life. We have progressed far enough to note the simpler forms of instinct in plant leaves and flowers which follow the course of the sun, or which grasp supports for climbing. Among lower animals we have noted a higher form of instinct represented in the guidance of the ant in all its acts, and a still higher development of instinct in the dog,—higher yet in man. Instinct in all plants and animals develops proportionately as cells develop more and more elaborate structures. The elaborated instinct of man becomes so buffeted by sensitizing bacteria that it seems almost like the flying particles represented by Brownian movements in colloidal gold, and we then call it reason, but it is all instinct, no matter whether the particles hop in the form of gold or fly in the form of reason. (Highly elaborated instinct.)

In the monistic unity state we shall speak of instinct as beginning, in its simpler form, with energies arranging themselves in the form of matter, then with matter which prefers to arrange itself in the form of an element like gold. The next higher degree of instinct may be described as the planning of form in a crystal. A step higher, instinct arranges the molecules of colloids and places chromosomes in cell nuclei.

A still more elaborate instinct maintains harmony in structures composed of several cells, with their nuclei. From that point on we shall note the instinct of plants and of higher organic forms in the same way as we now recognize it. Man began the study of instinct as he began the study of all other phenomena, by taking note of most obvious examples, and usually working from these upward toward himself, instead of backward toward the basic origin of phenomena. He recognized first the instinct of higher animals, because that was the most obvious. Theology tried to separate instinct from reason, but drew arbitrary lines only. Theology tried to avoid recognition of the instinct of plants, speaking of such recognition as paganism. In the monistic unity state we shall speak of reason as the highest form of instinct, and we shall follow it downward step by step through all organic life and through all inorganic combinations. Furthermore, we shall speak of it as a method of demonstration of antecedent mind. Defining sometimes means confining.

It is begging the question to say that a brain does not secrete thought as the stomach secretes gastric juice. There is danger of being misled in our use of the term "secrete." The brain liberates energy in the form of thought, while the stomach liberates energy in the form of gastric juice. Each is a product with work of its own still to do. Gastric juice goes to work upon objects near at hand, while thought goes to work upon objects both near and far. Both are engaged in work, and the energy of both goes back finally to the common store of energy, after taking their respective turns in the dance with material atoms of the body, in response to the measure of music set by the ether.

We say that man is a mind which has a body for its organ. It is equally true to say that he is a body which has a mind for its organ, because according to monistic unity theory a man

and his mind are simply interchangeable forms belonging to the three physical entities.

The will taking general charge of man, belongs in fact to the three physical entities. Eventually discharging its energy into the common store, the will merely plays its part in the dance. This will must vary in kind and degree quite as much as do the material atoms. The will can be trained just as the muscles can be trained, and it can be directed to influence matter in definite ways out of the ordinary. Many highly sensitized hysterics can produce stigmata of wounds which show clearly on the skin. Quite ordinary people can make the hands warm or cold through a few moments of directing the mind with that end in view. Religion, or a financial competence, have a marked tendency to lessen the arterial tension that is due to worry. The kind of religion or the amount of competence are not important so long as they suffice to lessen blood pressure by putting the mind at ease. If a religion like Christian Science can capture the imagination of a group of highly sensitized nervous people, and put them at ease, it is a valuable thing, not only for themselves, but for their progeny that otherwise might have more badly defective protective organs.

The will is manager of the intelligence but not master, at the present stage of our cultural period. The will is a creative or a destructive factor in life, according to dictation by the microbe, which is master. We are living under physiological conditions similar to the boss system in politics. This fact furnishes another object lesson showing that everything in the Universe follows the same general laws. The boss system in politics allows of government based upon the public purse, but ostensibly representing public interest. Men who are elected to positions of great responsibility pretend to be the rulers, and in this the public acquiesces. The public really knows how-

ever, in its subliminal mind, that the political boss dictates in selection of candidates. Action begins and ends in the boss system of politics upon a selfish basis of desire for the contents of the public purse. In a similar way the microbe wishes for the contents of our bodies. We pretend that the will is master of the intelligence, but the bacteriologist of a little later date in this century will present his report to the psychologist, who will state that the microbe is really boss. When we have arrived at a point in progress which allows us to do away with the boss system in politics, we shall at about the same time learn to do away with much of the boss system in relation to the will, or at least to know its terms. Both conditions are at present following a similar natural law.

Although the will is never wholly free, it can still dominate the effects of toxins over a part of this range of influence. An object lesson bearing upon this point is in evidence when I have caught cold or have been up late at night and neuricity granules need to be replenished. At such times, I am cross to those whom I love, and irritating to the people who are in my employ. I manage to cheer up wonderfully however, if it becomes necessary to make a pleasant impression upon strangers, or upon those to whom I wish to toady, or of whom I am afraid. The will is at such times dominating temporarily. My crossness is reserved for those who are afraid to resent it or who are too kind and patient to resent it. Observation of this fact allows me to extend sympathy to others who are habitually cross. I feel that it is due to some permanent illness or source of irritation. They are peculiarly prone to expend their crossness only upon those who will stand for it, or who cannot escape. An effort of the will is brought to bear when they wish to present a different attitude to people to whom they cannot afford to be cross, or with whom they would not dare to be cross.

Mental states have a distinct influence upon the body. An angry mother can poison her child's milk, sometimes to the point of causing the death of the child in convulsions.

Mind has influence upon the secreting organs. Think of fragrant, ripe, mellow red peaches with trickling juice that runs drippingly up your wrist when you bite through the tender skin. The parotid glands respond by making your mouth water.

The mind has influence upon the physical brain,—example, think of the fearful response that you made when called upon at the last dinner to make an impromptu speech.

Mind can influence the blood circulatory system,—example, worry raises arterial tension. Mind can influence respiration,—example, in moments of tension at the theatre the spectator holds his breath. Mind can influence the muscles,—example, some of my notes cause muscles of expression to show a smile. Mind can influence the sensory nervous system,—example, think steadily of your right hand for a moment and you will observe that one of the fingers is in a very uncomfortable position, so much so that the sensation will cause you to move the finger a little. Mind can influence the nerves of special sense,—example, smell a polecat before dinner, and the food tastes of propenyl sulphuret. Mind can influence the skin,—example, perspiration on the forehead of a man who has missed his train. Mind can influence vital resistance,—example, fear lessens the normal degree of impulse sent to the ductless glands which manufacture protective substances. In this connection we incidentally note as corollary to the mind question in animals, that a dog's mouth waters at the sight of meat. Ergo, if it is mind that makes a boy's mouth water, then the watering of a dog's mouth demonstrates that the dog also has a mind. Mind can influence digestion,—

example, bad news at dinner time stops a man in the midst of his meal, and food already taken decomposes and may cause colic. Mind can influence nutrition,—example, a herd of cows without horns will give more milk and remain fatter than cows in a herd where horned cows are given to annoying others. Mind can influence methods of motion from the cell,—example, an hysteric may liberate heat and send the body temperature up to 106 degrees F. Mind influences the method of impulse sent toward the cell,—example, a sleepless patient wishing morphine is given a hypodermatic injection of water and sleeps.

I take from a writer in one of the medical journals this statement: "The state of mind has far more to do with digestion than most physicians realize." This relation has long been known, and is proven by proverbs on the subject;—"laugh and grow fat," etc. People who do not worry and who do not think severely are more likely to digest their food well. Given a case of good digestion, laughter, and a reasonable degree of fatness, and we can predicate the general condition of mind pretty well. It is true that anger, jealousy and despair lead to decided chemical changes in the digestive secretions, sometimes very rapidly. On the other hand, the products of these chemical changes in a retroactive way, exert an influence toward anger or despair. It is a situation in which the will can in a way dominate over bacteria for short periods of time, but bacteria will eventually dominate unless the will is used effectively, and the will can be used most effectively when fortified by good health.

If one is inclined to be cross or disputatious and to find others wrong, he must remember about his badly metabolized toxins and exclaim, "It is not I, but my microbe that is asserting itself. Can I transcend the influence of the microbe, and be kind instead of cross?" One may stop and ask this ques-

tion,—"If the trouble is due to my God-given microbe, and if my intelligence and will are also God-given, are intelligence and will sufficient to transcend any part of the influence of the microbe?"

Many who suffer from the effects of microbe poisoning may transcend the microbe through power of the will, but like killing a salmon on a fly rod, in the long run it is a steady strain, which will eventually tire man and win for the microbe. The microbe will be here on Earth after man has followed the Pterodactyl.

The English and the Germans and other civilized people will rapidly become decadent as they arrive in turn at the limits of development intended for them by nature, and they will follow the Pterodactyl.

In keeping our sense of proportion, we are not to imagine that bacteria are directly responsible for all natural traits of character. The girl who is jealous by nature at five years of age will be jealous at fifty years of age. The boy who sulks at five years of age will sulk more or less at fifty years of age. Mental training and social environment can only intensify or lessen these natural characteristics. Microbes will also modify or lessen these natural characteristics. Microbes undoubtedly had a hand in shaping the plasm of ancestors toward these natural characteristics. The influence of mind upon the body is brought to our attention every day in medical practice. A mother who is caring for her little children has no time to be ill. A man who is worrying about four thousand dollars of debt and about to lie down upon the lounge with a cold, receives from the postman a check for five thousand dollars unexpected dividends. What becomes of the worry and of the cold? The man now has something else to look after. A silver dollar in place of every pill in the world, and to be obtained at current wholesale rates for pills, would cure more

ills than are cured by pills. Next to relief from financial care, sectarian enthusiasm stands in importance as a cure for mental and bodily ills.

Some forms of moroseness may in the future be modified by vaccines, or by removal of an original cause for the condition. A source of physical irritation sometimes makes a boy mean to his fellows, who rebuff him systematically in return, and he gets to be quite alone in the world in later years. Sometimes the removal of a source of irritation like defective teeth, adenoids, or eye-strain, will change this boy's entire character before he has established a habit of moroseness which is then difficult to cure. Moroseness beginning from some peripheral irritation is often continued by the influence of toxins of the colon bacillus, and that particular influence may be modified by the employment of vaccines. There are some cases in which moroseness depends upon cellular defects through inheritance, and it becomes our duty to classify different kinds of moroseness, and to relieve the ones which can be relieved by our resources.

When the proud young mother notes a seriousness in her infant's face, giving apparent evidence of deep thought, she foresees the coming philosopher, but her doctor knows that such a serious expression is caused by the presence of wind on the tummy,—due to bacteria. When the child becomes older and again very sober, his serious face and words may still be due to the presence of bacteria, but the world has not as yet recognized that latter fact.

Previous nations have gone down unduly because they did not understand that microbe was King. There will be the same history for all present civilized nations unless they get to understand the real situation. King Microbe disposes of one nation after another in the course of natural selection. He

is nature's ruler over organic life. The fittest nations for survival will be those which first recognize their greatest enemy,—enemy when they are impolite,—and their greatest friend,—friend if they acknowledge his power. Some day a nation may appear that will dare to face facts (Pragmaphiles), and people will see themselves as they are. Meanwhile nature wastes us as she does the maple seeds by purposely making us afraid to face facts (Pragmaphobes). The logical end of culture is elimination of the race in plants and in animals, including man, for the simple reason that conditions favor increasing power of the microbe synchronously with cultivation of plants and animals. The cultivated microbe wins in the end. We have chosen to proceed as though the microbe were not present excepting in a small inconsequential way. The horticulturist found that he could not make a good income unless he recognized the power of the microbe and guided his own actions accordingly, but the horticulturist has only done about what the chosen nation will do later in all human affairs.

A question which may well be asked is, if decadence will cease when we have learned about the microbe. We can only reason by analogy, and make comparison with orchards. Most of our apple orchards in the Eastern states at the present time have been neglected or abandoned because of increased difficulties of cultivation in the presence of increasing enemies. The question has reached such a point that only our best informed and physically able orchardists are enabled to meet competition of the microbe and of higher enemies. It will be the same thing among nations, and that nation which first understands that microbe is king will raise the most successful orchard of people, even though influences favoring eventual decadence persist or increase. The nations that are not able to survive will at least have the satisfaction of knowing why they cannot survive. In order to prevent too rapid progress in this

world, nature offsets the tremendous positive pressure of new scientific knowledge by the nearly equal negative pressure of our forgetting. We even forget amusing stories heard last night that we intended to keep in mind. The student of heredity in plant and animal life forgets for the most part that microbes are following laws of heredity along with higher animals and plants. A student of influences of environment forgets that microbes have to undergo changes in order to meet changes in environment. There are students of the Lamarckian theory of "appetency," which relates to adaptation changes in the shape of organs during the course of organic evolution. These changes are held to be due to relative degree of use or disuse of certain organs. Students forget that the microbe is all the while obeying laws like the best citizen one ever heard of. Students of the Darwinian theory of natural selection forget that the microbe, being small, is more alert at making natural selection for its own selfish purposes than are the higher forms of life. Students of the experimental methods of De Vries, in developing the theory of mutation as an explanation for the origin of species, forget about mutation taking place in microbes which are training themselves for the race like every single one of the larger plants and animals under observation. Rosenow has lately shown that a chain streptococcus can undergo such rapid mutation as to become a capsulated diplococcus in the course of a few days of impelling environment. All who study variations relating to individuals, and to the direction of transmission of characteristics, must take into the problem a factor usually forgotten, that the microbe is expert in making practical application of questions of orthogenesis. The microbe, not having mind sufficient for constructing great systems of imaginative philosophy, wastes no time at that sort of thing, but goes straight ahead with whatever is found to be most pragmatic in regard to its

own adaptation to environment. This is commonly forgotten, although a certain number of men know and remember the fact. Such a fact is not generally seized upon, because the majority of men are naturally so much more fond of speculation than of facts. It is one of the habits of *Homo sapiens* to leave himself vulnerable to such an extent that it apparently represents a purpose on the part of nature,—a purpose having for its object the avoidance of over-population.

There are sensitive children who dislike to read English history because they say, with a shudder, that it is just a series of murders. In the same way, children five hundred years from now will read with a shudder of unnecessary murders by bacteria, which were allowed up to and into the twentieth century.

Man being the only animal capable of systematically bringing about his own destruction, and the destruction of his race, and doing this with the aid of his intelligence introduces a significant fact. It seems to indicate that nature arranged for a division of labor with man in order to dispose of superfluous individuals in the course of evolution. Man applies various and complicated resources for resisting the introduction of knowledge into his mind—otherwise our progress would be too rapid—like that of an oak tree growing to a height of eighty feet in one day. Intelligence applied in certain ways could send any one civilized nation far ahead of others at a pace too rapid to be in accordance with nature's plan. Let us say, for instance, that all of the people of a given country are patriotic enough to obtain a report from the gastro-enterologist relating to colonic bacteria found in excess in each individual,—each one learning of the features in his own life habits which allow bacteria to grow to excess. If the individual then regulates his habits accordingly in order to insure his own best efficiency, he incidentally entails to the state

children who are uninjured by colon bacilli. This would show a higher degree of patriotism than has ever been demonstrated in any nation up to the present time. Nature has to guard against such sublime patriotism on the part of any one nation, and would at once set orators and writers at work, with ridicule for their weapon, to prejudice the people and to confuse them. Nature allows individuals to bring about their own destruction through their acquired habits of life. Gradual wholesome destruction of each trial nation then ensues in the course of evolution.

Almost any one of the leading civilized nations could dominate the world to-day if nature chose to allow it. Take Russia for instance, with her millions of men, most attractive and lovable people, brimful of human attributes. Nature, perceiving danger, preserves a balance by putting underhandedness into the nature of doubling roses in the ruling class. Consequently this chief evil of bureaucracy prevents Russians from dominating. Their shells sometimes fail to go off when fired at an enemy, because high officials put the powder into their own pockets when contracts for arsenal supplies are made. Nature further made protection against the Russians by setting them at celebrating feasts and getting jolly at critical moments for their army officers. I had one friend in the ruling class in Russia who was really respected and not suspected by his neighbors, but for the most part their distrust of each other is upon a basis which they fully understand. In Russia dishonesty stands in the way of domination,—in Germany, philosophical doubt,—in France, a rapid and beautiful doubling of the rose; breeding comes to a close early. One can go over the entire list of civilized nations and note how nature preserves a balance, in one way or another.

Is ours the chosen nation? That depends upon ourselves perhaps. All nations are like flocks of sheep, gregariously crowd-

ing the cities, following any leader with a bell that can be heard, and not stopping to feed if the bell leads them ahead at too great a pace. At present it is the leader under industrial conditions who is carrying the bell. Nature employs ovisness as a corrective against individualism. The sheep motive is apparent in almost every phase of human activity. Ovisness, in fact, is a synonym not only for fashion and fad but for the more serious religious, political, scientific and economic movements of a gregarious species.

Individualism is shown chiefly in its larval form of egotism at present. When the chosen race comes, this egotism, which represents nature's plan to keep the flock running close behind the bell-wether, may develop into adult individualism. Individual noble stags follow no bell-wether. The time has not come for any chosen race as yet, because it is more convenient for nature to keep us in flocks called nations, in order that the fattest may be more easily removed for slaughter and the ill ones eliminated. Gradual evolution is leading toward a type of man strong enough and individual enough to be left to himself away from the flock. We may all perceive the fundamental beginning of that individualism now, but in its present form it is egotism, leading us to follow the bell-wether at her own pace into the cities toward the bonfire. Those who cannot feed while maintaining the pace, perish before reaching the bonfire. Is the nation yet here on earth that as a whole can change from the larval form of individualism (egotism) into adult individualism with wings? Perhaps not as yet. If you and your friends are ready to change from the larval form of individualism into the adult form with wings, then ours is really the chosen nation, and our individuals ready to become part of a group of a billion gods. Each one of these gods is to be sent to some other universe, some undeveloped universe, in which egotism, the larval form of individualism,

still keeps people in flocks, pending the time when proper elimination can be made in that other universe for the purpose of developing still more gods. Our whole universe appears to me to be a god-making system, if the trend of its evolution means anything understandable by man.

While destiny is read in one way by an individual who is under the influence of tuberculous toxins, and read in another way by an individual under the influence of colon bacillus toxins, the normal mind sees readily enough our general destiny. There are abundant object lessons in history for clear vision. According to the monistic unity belief, we shall have a long series of Egypts, Hallstadts, Romes, Perus and Greeces, for millions of years to come, each cultural period leaving something of value for nations which are to follow. Last will be best!

We must squarely face this fact that the logical end of culture always has been and always will be extinction of any one nation,—making way for another nation to follow. New nations in the future as in the past will develop in their own ways up to nature's limitations for them. When the microbe has done its duty, still other nations will be developed,—starting out as varietal hybrid types from racial protoplasmic stock.

One reason why I imagine the chosen nation is not yet on earth is because almost any one of the civilized nations has means and power for dominating the entire earth at the present moment, but is not allowed to realize that fact. To each larger civilized nation nature has given power and means, but is withholding knowledge of ways and means. Latent power and knowledge already in the possession of each civilized nation are like the means and power within one hundred acorns. Perhaps not one of the acorns is to be allowed to form an oak tree from this season's crop. All of the civilized nations now

on earth are but one season's crop in history. Nature's method of raising so many acorns to compete with each other, and so many nations to compete with each other for advantage of position, is simply part of a system of stupendous waste. Nature wastes acorns no more lavishly than she wastes nations,—preparing to have a winner over all at last.

Another reason why I believe a chosen race for domination of the earth is not yet here, or is in the background, is because decadence is progressing so rapidly in all of our present nations of civilized people springing from races in this particular spherical garden of ours. Doubling of the flowers is progressing too rapidly for maintenance of a physical winner. Geniuses are increasing at a rate indicating the best expression of each race within its respective nation, just before each nation goes down. As birth-rate decreases the number of geniuses increases. This seems to be one of the methods of nature for keeping a balance. It prevents any one nation from progressing disproportionately until nations enough have been tried out and wasted, in the time and plan of nature. Just as weevils eat most of the acorns not utilized in evolution of the oak, so microbes eat up nations that are not chosen to win.

Given the fact known to some of us, that each great nation already has the means and the power, but not the knowledge for winning,—given the fact known to some of us, that the microbe and nothing else stands in the way of any civilized nation,—the deduction seems clear. A nation intended for survival and for dominating purposes as expressing its race will simply be directed by nature to place bacteriology as the first study for its people.

Nature will direct that people to employ pedagogy for supplying conditions of growth, just as the gardener now supplies conditions of growth for plants. Pedagogy—the distributing science, utilizing our knowledge of bacteriology—

the producing science, can supply the conditions of growth for a winning nation right now.

Physical suffering has been as great as mental suffering,—untold misery in fact,—because people have not as yet learned that God cares for the microbe. He will grow it at the expense of human bodies if men do not have a care to follow the rules of life for man as consistently as a microbe follows the rules of life for the microbe. It is the old story of competition between organisms which are fully equipped for defence, and others which are improperly equipped for defence. The best equipped will win according to nature's plan, no matter whether it is man or microbe.

Military honors will continue for some time yet to go to the man of sword and gun, because there is not sufficient pomp and circumstance for thrilling the cheering multitude when a victorious army returns bearing aloft its battered microscopes. This is nature's little joke, placing in men a love for display very much as she gives the peacock a grand tail which retards its escape from real enemies. War eagles, ragged flags, and battered cannon will continue to mark the victor's return, instead of battered microscopes and ragged sheets of formulæ for officers and men with instructions for avoiding the greatest enemy, the microbe. Nature interferes with our plans for limiting the rapacity of the microbe, by giving men a consuming love for the pomp and circumstance of war. It now costs on an average about fifteen hundred dollars to kill a man with a weapon, according to the statistics of Jordan, in "Science" for December 6th, 1912. In the Boer War, the expenses ran up to nearly forty thousand dollars per head of game killed; and this is more expensive than grouse shooting at the opening of the season in Scotland.

In the Turko-Bulgarian war it was not necessary to use so

much ammunition. When allied forces had concentrated the Turks, the cholera microbe took a hand in winning for Bulgaria. The microbe has always done this to a large degree in every known war.

Nature does not wish any of the present civilized nations on earth to make note of the fact that at least eight soldiers are killed by the microbe for every one killed by a weapon. It is a matter of clear available statistics and indisputable, but there is so little idea of grandeur in the artillery officer turning from the sights of his big gun, and looking into a microscope, that it would seem to him a descent from the sublime to the ridiculous. Consequently the microbe will continue to win until the chosen nation appears, a nation which will look down into the microscope instead of along the big gun.

Strindberg, who was an ill man and a corresponding philosopher, referred contemptuously to a certain acquaintance as "one of those devils who speaks well of everybody." From his point of view no man could do that unless he was insincere, but any man in bounding health and with the point of view of Voltaire can speak well of everybody with perfect sincerity. It is a matter of comparative metabolism.

The most important thing when taking up a new subject is to keep it in right proportion. What proportion of people may suffer from disturbed metabolism, without reference to microbes? That I do not know. You do not know. The subject is open for discussion. Psychology has moved up from its jungle of artificial ideas to a dignified position within a very few years. The bacteriology of this morning is not that of yesterday afternoon. Pathology is just now rolling over in the cradle and peeping out of one sleepy eye at allergy, which has given pathology a shake. Physiology was a comfortably stable science for many years until the hormones of

collateral sciences caused it to secrete new ideas, and the ductless glands poured their contents all over the old text books, spoiling their index pages. The medical dictionary of to-day has to be published with accordeon binding, and interleaved for notes. How then is one to maintain a good sense of proportion at the present moment, in those subjects in which winged folks must fly where other people are afraid to tread?

America has joined if not led other countries during the past century in the division of natural and physical sciences, particularly in regard to their practical application. There has been rather less American attention given to philosophy, literature and art, but the time is now at hand for another renaissance, in which letters and art may again keep pace with the sciences. The new renaissance will start from a study of the development of all human activities under contract with the microbe. The entire range of human activities has been carried on previously with only one half of this contract understood. With business contracts there is a saying that the only one to lose is the one who has money to lose. In carrying out the microbe contract, man has been chief loser because of his careless reading of the terms of the contract.

Originality in a writer or inventor proceeds fundamentally from his normal mental processes, but variance of morbid character occurs through variance of development of microbes in individuals.

Under conditions of over-stimulation of growth in plants during the process of higher cultivation, it is a fact that microbes, although unseen, increase tremendously under the same conditions. We must always remember that cultivation for plants means nothing but giving microbes a better chance for growing. It brings a new responsibility upon the protecting soma cells of plants—they have too much to do. Soma

cells are obliged to neglect the germ cells or else to call them over into action as allies. This causes the doubling of a flower. Some of the germ cells ally themselves with soma cells and make petals out of stamens. Finally not enough germ cells are left for developing ovules or pollen sufficient for construction of gametes. High cultivation of plants serves man's purposes by developing certain characteristics of root and fruit which he desires, but man forgets that he is not helping nature through his selfish action (selfish not used in sentimental meaning, but only in a comparative way). High degree of cultivation of animals, including man, has the same effect as in plants. Soma cells are called upon to wage warfare against microbes, which increase tremendously under conditions of town life. Germ cells are neglected, or called over to become allies of the soma cells. Neglected germ cells then go to skirmishing or to morbidly protecting, instead of remaining in reserve for proper natural use. They may set the mind at constructing the selling part of modern realistic literature, or at class teaching of sexual questions in the schools. They may cause perversion of function, followed by abnormal excess or abnormal absence of the natural impulse belonging to natural structures.

The plant or animal then, under stimulation of a cultivation which at the same time cultivates microbes in excess, must suffer injury through the increased efficiency of its enemies. If we realize that such increase in efficiency of enemies is under way, the situation will be met as well as possible by man. This has not been understood. It is to be one of the privileges of life in the coming part of the present century for men to get into an understanding of the warfare between man and microbe, and to so conduct culture that the enemy will at least be met on fair terms. At the present time, the enemy is not being met on even terms, as we may note in

the object lesson of rapid decadence of cultivated plants and nations.

The doctrine of cultural limitations as applied to man, to lower animals, and to plants, has not been a feature of the teaching of biologists of to-day so far as I am aware. It is brought forward as a topic for elaboration by the biologists of to-morrow.

It is possible for cultivation to be so conducted as to give us a progressively better type of man, as we note in the concrete object lesson of the pecan which is used elsewhere in these notes for purposes of illustration. Constant slow elevation of the mean type will be agreed upon as satisfactory, instead of (as at present) allowing geniuses to develop out of proportion wastefully, and their families to die off cruelly. We have been impractically ambitious about developing extreme types among plants, farm animals, and men, without regard for the shrewd patient microbe in the contract. We have been too impatient about it. This waste and cruelty is largely due to such impatience. If we can steadily, but slowly and surely, guide the pecan tree to furnishing better nuts, and the man to healthier genius, preserving a good balance between germ cells and soma cells, we shall copy nature's plan for maintaining best efficiency in the interest of real progress.

Progress by jerks is where loss offsets gain. It is nature's plan to kill off the impatient through the agency of microbes. We are to make gods of ourselves, slowly but surely, if civilized nations at present on this earth are competent to comprehend the matter. Otherwise civilized nations will continue to decay as they really now are decaying. Nature will be obliged to go all over the ground again tediously with other nations, in later cultural periods.

This has been nature's method in the past, it will be nature's method again, unless some one nation chooses right now to

make its cultural period extend straight forward, in full knowledge of the microbe enemy, and in full belief that man in the end is meant to form a species of god.

Pessimism in regard to the future of any nation is simply a statement of special ignorance,—of ignorance in relation to the microbe contract in all proceedings of organic life.

CHAPTER II

Taine wished to find a scientific basis for literary criticism. At the present time we may approach such a basis. We may say, for instance, that a certain writer is allergic. He expresses unhealthy poetic sentiment because of sensitization of his protoplasm through the influence of a definite bacterial agent which may be found and described in the laboratory. Allergy may give rise to marked symptoms of intoxication with liberation of "divine afflatus" of a characteristic sort.

My idea in seeking for a scientific basis upon which to place literary and artistic criticism was due to the discomfort or disgust that so many of us feel when reading works of some of the modern authors, or hearing certain music which seems to be recognized by a great number of people as representing the latest thing in culture. To my mind these creations did not ring true to life. This was either due to my not being up-to-date,—and incapable of responding to the influences of modern culture,—or else there was illness on the part of some authors which might be recognized as such by a member of the medical profession if he were to send his forth-faring instinct in their direction.

The science of bacteriology will eventually comprehend this question of the relation of microbes to authorship as well as to decadence. We have progressed so far as to recognize the symptoms of allergy to strawberries, milk, and shellfish.

Understanding that much, we have learned how to make people resistant against certain toxic influences of this character. The new knowledge in medicine which we may foresee, is to make men resistant against allergy to bacterial toxins. If allergy is later shown to represent a protective process, we shall help men to resist the toxins which call out allergic response. This part of progress for the world is to be developed by the medical profession.

A little alcohol is believed to be digested and made use of in animal economics. It is not improbable that some of the toxins of symbiotic bacteria may be useful in the animal economy,—or even the toxins of harmful bacteria when in moderate doses. It is only when check upon them is lost that such toxins become injurious. Once that tolerance against microbe toxins has been established and antibodies called out by the individual, the protection may remain quite permanent. This gives us much courage in our hope of changing the character of the work of many authors.

We have at the present time a great flood of cult writings and of regular medical literature relating to the mind and its effect upon bodily functions, in health and in disease. There is neglect up to the present time of another side of the question,—the influence of health and disease upon the mind as it is displayed in art and literature. Let us now press this particular button.

Painting, literature, music, architecture, sculpture, spring into light from a basis of science, as the blaze springs from a cup of oil. The blaze of expression occupies more space than the oil of science, but depends upon it nevertheless, and the blaze must die down until the cup is refilled with more science from time to time. Our new science is to give new colors to the lights of culture.

The joyous privilege of twentieth century criticism will

consist in our employing the brand new standards furnished by science for elevating criticism high above the bewildering impressionism that has belonged to its passing history. Criticism will be lifted out of the general solvent of relativity, which has interfered with its crystallization. History, biography, and the common forms of outer fact will still serve as auxiliaries for criticism, but the criteria will come from science.

Upon our scientific knowledge of metabolism and the influence dependent upon its various normal and abnormal phases, our standards are to be founded,—from within,—where the spirit has always wished to dwell. The spirit has been repelled previously because outer fact guarded the door, and the spirit had to keep rising, rising and returning. Science now opens the door.

During the era of superstitious impressionism in criticism, it has been assumed that we must accept talent for what it is, and that we were to observe only if talent accomplished what it aimed at. The talent of paranoia often accomplished a misconception. The aim itself and motive directing that aim have received less attention than the mere question if talent and genius were displayed. If talent and genius were displayed, and their aims accomplished, that sufficed; and critics then undertook the responsibility of interpreting. Interpreting what? Sources of aim? No! The relativity of talent as expressed by any genius toward affairs of human life! We did not care whether we were shot accidentally by a friend or by an enemy, but were satisfied to know that the aim had been true.

"Talent, being talent, represents value," said Criticism, "and if its application to human affairs is not obvious, ours is the duty to find where it belongs." Right there is where Criticism groped in the dark. It could not know that the marsh

wren builds several false nests which are misleading to the enemy looking for its real nest with eggs. Nature builds false nests of talent in order to inhibit too rapid progress in our finding nests of talent containing real eggs. She builds false nests of talent in reeds that have been stung by the microbe. Criticism examined these nests, and wondered, trying to interpret.

The tubercle bacillus, the colon bacillus, and many other microbes, sensitize the protoplasm of genius, which then becomes allergic, building false nests. Criticism could not tell a false nest from a true nest, because each nest representing talent looked like all other nests.

Talent, then, does not necessarily represent value. We are no longer, in this twentieth century, to accept talent for what it seems to be. We are to know that its aims though accomplished may be quite misleading, at times when they represent nothing more than evidence of allergy, and bespeak microbe affairs rather than human affairs.

Criticism has tried to reconcile science and romanticism, but could not accomplish it, and could not even see that modern romanticism was confounding what was lowest with what was highest in a sort of pseudo-Platonism. Criticism could not see that talent of the insane often exceeded talent of the sane, both in degree and in quality. Both kinds were given a face value, which led to their being placed in that pigeon hole marked "talent," and everything placed in that pigeon hole was supposed to be argument suitable for use in confronting life,—the supreme court judge.

Finding our standards then at last, where the spirit can join its lover science, we shall ask the dilettante impressionist critic to step out. We shall place on the balcony for an airing the neurasthenic æsthete, who has indolently looked within his own temperament for standards in criticism.

One cannot have judicial faculty highly developed in criticism unless interpretative faculty furnishes true evidence for consideration. Interpretative faculty cannot furnish true evidence for stimulating high development of judicial faculty in criticism, unless we recognize that something has been omitted in the whole past view of life,—that "something" being the keystone of the arch,—the microbe.

The microbe, smaller than a pin's head, has in the past stood before the pupil of the eye of Criticism, preventing a view of allergy and of the clinical psychoses engaged in their part of the work of making literature, art,—all history, in fact.

A man is what his bacteria make of him.

The fundamental duty of the literary critic is to first take steps for noting the physical characteristics which led to mental expression.

The direction given to minds of authors by microbe toxins of all sorts, from the alcohol of saccharomyces to the poison of duodenal anerobes, has never been studied as a separate subject.

The psychopathologists claim to be in a far better position to judge and interpret abnormal characters in literature than are the literary critics. This claim is correct so far as it goes, because literary critics have been ignorant in character study, through no fault of their own. It was only a fault of times now passing. The psychanalyst may be better able to interpret abnormal characters in literature than is a literary critic, but he at the same time makes only one step forward and will lead us astray unless we are very careful. The psychanalyst is ignoring the bacteriologist. He needs watching. Look out for the psychanalyst in his present stage! Ignorance is not to be charged against literary critics, because the fault has been due to general lack of knowledge up to the present

time, but we shall hold the psychanalyst to far stricter account, because he is in a position to learn what the bacteriologist has to tell him if he is willing to listen. The literary critic has been willing to listen, but the psychanalyst often suffers from the effects of metaphysics.

A schematic description of genius is simple enough from the microbic viewpoint. For example: Genius consists in a high degree of sensitization of the protoplasm of any organism through the influence of or by toxic products of body cells which respond to inimical influence of any one or more kinds of microbe. Protoplasm highly sensitized in this way vibrates in response to external impressions, with concentric waves of various diameters. A man who is a genius is said to have remarkable associative faculty. Great associative faculty means that the outer rings of a man's concentric vibration series have great diameter, but notwithstanding the great diameter of his outer vibration rings he recognizes facts occurring at various points along the periphery of a certain ring as belonging to that ring. A lesser genius associates fewer facts, because of his smaller vibration rings. Genius is not an entity. There are no lines of demarcation to be drawn. It occurs in varying degrees among all animals and plants. If the expression "genius" is applied to vibration of abnormally sensitized protoplasm, and if nervousness is also due to vibration of abnormally sensitized protoplasm, what is the difference between genius and nervousness? The difference is that between music and noise. Genius represents orderly vibrations: nervousness represents disorderly or conflicting vibrations. Alcohol and various drugs, like microbe toxins, also cause undue vibration of protoplasm. A genius who is nervous in addition, finds that by adding certain drug vibrations he can dispose of many of the smaller conflicting vibra-

tions of nervousness, and make them all merge into his larger, more orderly concentric rings. Alcohol, tea and coffee may be called tuning forks for the genius who is also nervous. Most geniuses seem to need these tuning forks in order to excite orderly series of vibrations among conflicting waves, and in that way to bring about harmony with their own concentric ring vibrations. Let us say that a certain man is a genius because his parents entailed a tendency for his cell protoplasm to vibrate to certain kinds of external impressions. They may be impressions in art, literature, finance, engineering, anything which appeals to and makes impressions upon men. The highly sensitized protoplasm of this individual responds to waves of art, of literature, of finance, or of engineering; and if his concentric rings of responsive vibration are large, he shows great associative faculty in recognizing the relation of various harmonious facts which are situated at various points along the periphery of his largest ring. A famous thoroughbred horse, like Lord of the Vale, for instance, is a genius. A Leghorn hen is a genius. A double flowering almond is a genius. The protoplasm of all these geniuses responds to vibrations excited by toxins of various microbes. This overstimulation of highly sensitized protoplasm results in cell injury of both soma cells and sex cells; consequently, any one of these geniuses is apt to have ill health, and quite likely no progeny, or progeny that is feebly resistant and succumbs quickly to ordinary destructive agents.

If genius is due to abnormal vibration of protoplasm in response to the impact of fact, and if nervousness and insanity are also due to the same cause, what essential difference is there then between genius, nervousness and insanity? In a mechanistic sense these graphic charts, wholly schematic, illustrate the difference between genius, nervousness and insanity.

Figure 1. Genius. Effect of impact of fact is manifested in orderly vibration rings, like those of music. Dots represent various facts belonging to one ring. These facts are associated at once in the mind of the genius as relating to one ring.

Figure 2. Nervousness. Effect of impact of fact is manifested in disorderly vibration rings, like those of noise. Dots represent facts which come into conflict with each other as the vibrations bring them in contact.

Figure 3. Insanity. Effect of impact of fact is manifested in orderly vibration rings, but with interferences along the peripheries of rings, like those of cacophony. Dots represent facts belonging to ordinary ratiocination; stars represent morbid fancy. Here we have fact and fancy wrongly associated in the mind of insanity as belonging to the periphery of one ring, because a fancy ring interfered with a fact ring. (The word "fancy" is used in the sense of including misconception, delusion, illusion and hallucination.)

If a joker associates incongruities, how are we to distinguish his vibration rings from those of the insane? The joker, through an effort of the will, voluntarily makes dents in the peripheries of his rings, and for the sake of sport, associates facts not belonging to each other (belonging to separate rings). In the insane, this interference is the result of toxic accident and not voluntary. People without sense of humor look upon the joker very much as they do upon one who is insane.

A healthy genius is not different from the mean normal type of man excepting in the greater range of vibration circles, which reach out and come into contact with widely separated and distant facts, all of which are reported to his mind as being associated with the periphery of some definite ring.

The insane man may have a range of vibration circles quite

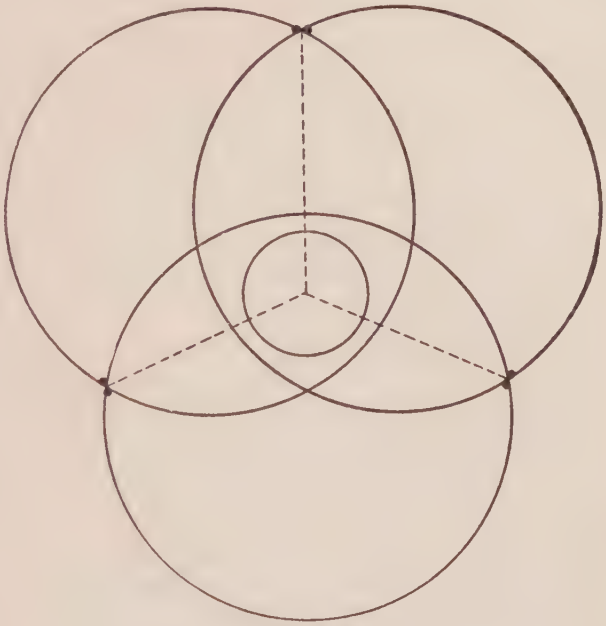


FIG. 2

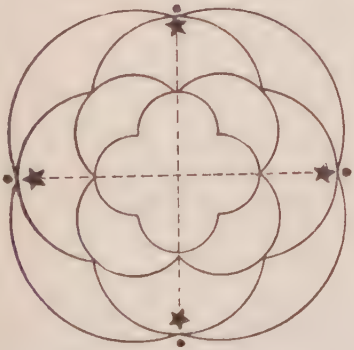


FIG. 3

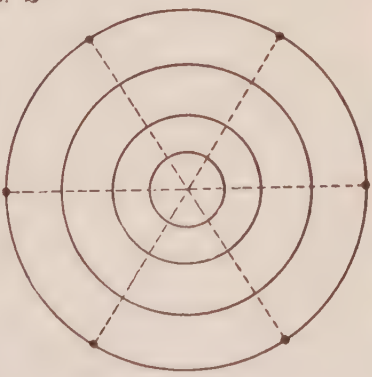


FIG. 1

as great as that of the genius. He may associate widely separated and distant facts quite as truly as does the genius. Confused with these facts are various morbid fancies belonging to another ring of vibration which has come into contact with his ring. Fact and fancy being then reported to the brain simultaneously, as associated, he cannot distinguish between them. One reason why the world has been so slow to understand about insanity is because the term is occasionally held to be synonymous with "lost reason," and of a degree requiring restraint. A man may believe himself to be Queen Victoria and yet rational enough on most subjects to conduct business affairs. He is simply thought to be queer when he speaks of himself as Queen Victoria, and his associates do not realize that he really means it. Incidentally he has other obsessions which show themselves in the course of his activities and in his views, and these being mysterious are sometimes suspected to represent genius.

We classify minds as belonging to the first class when marked by creative genius, second class when marked by inventive talent, third class when marked by coordinative ability, but these values refer to the mind in its value to the public, rather than to the individual. The larger number of strong individuals who are useful for propagation of the race possess third class minds. There are fewer propagators among men possessing second class mind, and fewer yet among people of first class mind. Among the latter we find very few individuals of value for propagation of the race, although of enormous value for the purposes of other individuals,—of society.

The world's history has been made by the insane, by epileptics, and by men of neuropathic stock in general. The first clever response to this statement is apt to be: "Well, let us then all become insane, epileptics, or generally neuro-

pathic." In rebuttal we must ask to have the sense of proportion observed. For every genius whose work serves as a thread for engaging precipitated crystals of human thought, there are thousands of decadents who exert a malign social influence, who fill our prisons and almshouses and who spread sorrow through the homes of our fair land. The brilliant intellectual qualities of even the genius himself are usually associated with lack of moral sense, of sound judgment, or of aptitude for higher control. Further than that, real geniuses who have exerted malign influence are about equal in number to real geniuses who have advanced civilization in this sentimental world of ours. On the whole we might have gotten on pretty well without any geniuses at all, had that been nature's plan. So far as we can judge however, nature wishes to have successive crops of our species reach cultural limitations and then die off, after making brilliant display in abnormal ways, before perishing.

Ribot says that the difference between genius and insanity is only that genius has critical sense. Who, I would ask, is competent to decide if his own interpretative faculty suffices for determining that the critical sense of any given genius has captured no fancies along with its facts?

Genius represents the doubling rose and portends the end of a family.

The superman is a man ending his family lineage in a blaze of glory.

In days when superstition prevailed, the ancients believed that both the genius and the insane were inspired, but they held that a genius who appealed to them favorably was inspired by Divinity and that the insane were inspired by the Evil Spirit. At the present time we have mostly dropped the Evil Spirit view, but still hug the idea that inspiration of genius is of divine origin. That now is about to be changed

by ascribing rational character to inspiration. Plato, in "Phædo," says that delirium is not an evil, but a great benefaction when it emanates from Divinity. Aristotle, in "Problemata," says, there is no great mind without a mixture of insanity. Neither one of these classic authors could have founded a basis for correct observation in the matter, because the action of the microbe in sensitizing protoplasm was at that time wholly unknown, even the presence of the microbe being unsuspected.

The genius is quoted only as one example of excessive microbic influence. Millions of other individuals suffer from microbic influence but without making such striking demonstration as we observe in the case of a genius, with his notable degree of associative faculty and self expression.

Various kinds of diseases were once classified under the head of leprosy, and finally, by exclusion, confined to a definite group due to a specific bacillus. So in literary leprosy I would trace all of the various malign influences down to a point where responsibility can be placed upon microbe action.

The world tries to be generous in relieving a genius from obligations and responsibilities, but it must also relieve itself from deleterious influences of genius, and maintain its balance.

Genius is more valuable to the nation than to the individual, and sometimes destructive to both.

Genius appears to be nothing more than associative faculty of high order. High order of associative faculty belongs to the group of phenomena manifested by individuals whose cell protoplasm has been sensitized beyond the mean degree. This sensitization is due to microbe influence, no matter whether from direct toxic impression made by bacterial products, from liberated endotoxins, or from proteolytic end-result poisons. The main fact, that cell protoplasm is peculiarly

sensitized through microbic influence of one sort or another, is the only fact that concerns us in the argument. The highly sensitized protoplasm of the genius is particularly vulnerable to injurious toxic stimuli. At the same time it is particularly responsive to impresions made by facts upon a mind which is tuned to the "vibrations" of a large number of related facts. The fact of this sensitized protoplasm being peculiarly vulnerable to injurious toxic stimuli accounts for the observation that geniuses are so often ill men.

There are as many geniuses among bankers, engineers and railroad magnates as there are among artists, painters and musicians. The only reason why we instinctively think of genius in connection with literature and art is because the geniuses in such fields are free to present a record of their feelings to the public. The geniuses among bankers, engineers and railroad magnates are obliged to have their feelings checked up by brutal Boards of Directors, and the application of their visions must have a very practical bearing. There is no difference, let us say, between the degree of genius of a given railroad president and of a given writer. The railroad president has his visions checked up by a board of fifteen directors chosen by the stockholders because of their known responsibility. The writer, on the other hand, or the artist, is free to let his visions percolate through the minds of the mass of readers whose responsibility belongs in no sort of classification. Literature and art give an outlet for both good and bad abnormal feelings, but railroad and bank management give an outlet to little excepting the practical application of feelings of their presidents, and only when these are abnormally valuable. By "abnormal" I mean the feelings of genius. The banker, engineer, or railroad president, who is a genius must be mentally sane in order to maintain his position. The writer or artist may be eminently sane or he may

be in some stage of actual clinical insanity at the time when his feelings go on record. Mistakes are made in considering the question of genius unless we divide the question into two distinct parts,—first, the value of a genius to the race, so far as his mental product is concerned; second, the value of a genius in so far as his physical product is concerned (his progeny).

A creative genius may present a mind of the first class, but this is not handed down to progeny. Men have assumed that products of a highly developed plant or animal of any sort were desirable, and that the plant or animal furnishing such products was desirable as a type for propagation. All our efforts have been toward establishing such types among plants or animals, but herein lies the fallacy when we deal with genius, because we are dealing with variation from the mean type. Mutation is constantly occurring among plants and animals as a result of special stimuli. Variants from a type do not have a tendency to dominate and to supplant the type form, excepting under conditions where variation has resulted in response to prolonged environment. Variations occurring as a result of injury through microbe toxin are not of the sort to establish a new desirable type among men. Men may show practically a creative type of mind while they are in the euphoric stage of a definite psychosis, and when they are actually clinically insane, according to some of the newer classifications. The question of proportion enters here. In most of the stages of psychoses in most of the men who are actually clinically insane not much work is done. Otherwise the asylums would furnish a great outpouring of minds of the first class. When a genius gets as far as to the asylum he is entirely out of gear as a rule, but before that time, or after, when on parole, he may do very remarkable work of enormous value or of enormous harm to society.

If so many geniuses are insane it may be asked why we do not hear more of genius directly from the asylums. The answer is, because the converse of the proposition is not true. Many geniuses are insane, but not many of the insane are geniuses. So far as that particular point is concerned, however, we may find at almost every state hospital some one or more inmates who are looked upon by the officials as men of very remarkable mentality, and who might exert great force in various fields of work in the world were it not for a psychosis which makes them as irresponsible as were Dean Swift, Rousseau, or Strindberg.

The genius serves more useful purposes for the world than for his family or for himself, as a rule.

We have been wasteful in allowing our geniuses to develop like Topsy, not knowing how to guide them for obtaining best value, not knowing how to conserve their strength, or to take charge of their families for developing more geniuses from the same family.

Drill a row of holes in a rock and put in white pine plugs. That will represent our knowledge up to the present time of the order in study of art and of literature. A series of dark holes with a teacher in each hole. Pour on the microbe,—and in a few moments we shall see a cataclysm in educational methods.

Microbe toxins give us a sort of literary solvent, allowing us in the library to reduce many mysteries to simple formulæ for analysis,—from the literature of ecstatic passion, to that of more orderly emotions, and to the literature of calm science. They intensify normal thought, or provoke new thought.

In scientific criticism of genius in literature we have to make note of some such order as this:

1. A mind allergic to the tubercle bacillus (Stevenson with his spirited optimism).

2. A mind allergic to the colon bacillus (Nietzsche with cry-baby philosophy).

3. A mind belonging to a definite psychosis,—hysteria (Mrs. Elizabeth Barrett Browning, with grace and sweetness in morbid exaggeration of feminine characteristics).

4. A mind with a definite psychosis,—cyclothemia. (De Musset, with fine inspiration in the euphoric stage. He did not write much when in the depressive stage because dipsomania supervened.)

5. A mind with another definite psychosis,—manic depressive. (Strindberg, with beauty in his collection of "Fairy Tales," belonging to the euphoric stage; distress in his "Inferno," of the depressive stage.)

6. A mind that we might classify at present as belonging to the internal secretion of aberrant gland development. (Octave Mirbeau represents the latter.)

A manic depressive might represent almost any one of the above authors in the different stages of his disease cycle, because we are in that case dealing with a psychosis of great range. In the case of a writer like Mirbeau in whom we do not recognize a definite psychosis, or allergy to any known bacterium, we might classify him, for purposes of illustration, as responding to the influence of internal secretion of some ductless gland abnormally developed. Such response to a certain kind of internal secretion need not be directly microbic, but might be one remove away, in hereditary defect, entailed from microbic injury of progenitors. The abnormal cell construction furnishing the internal secretion, let us say, was entailed by parents, but his individual views are tinctured by secretion as definitely as one sees yellow when he is under the influence of a dose of santonin. Mirbeau is a very strong writer in the sense that an overbred dog is strong when he rolls in filth and comes into the house to be petted. Swinging

aloft in air the sword of his wit he plunges it to the hilt in nastiness and exclaims, "See what a sword will do in the hands of genius!"

We may not know without scientific laboratory examination if an author is really poisoned or if he shrewdly concocts a stench that will sell to the poisoned crowd. The trend of Mirbeau's thoughts in general would suggest toxic influence, and yet in "Le Jardin des Supplices" I seem to discover in his comments on the Chinese gardener a key which leads me to think he is simply insincere, and writes to squirming maggots in the public in a very frank way. He says the Chinese gardener is superior to the French gardener because he does not wish to destroy the natural beauty of plants by the disrespectful practice of criminal hybridization. Those who do that are true malefactors he writes, and no law could be too severe for them. He says it is infamous to destroy the moving grace and beauty of simple flowers, and there is still further degradation in giving the names of famous warriors to the flowers which have been developed unnaturally. Scientific literary criticism at this point makes it necessary for us to learn if Mirbeau is physically well and a clever fakir. He dedicates this particular book as follows: "To preachers, soldiers, judges, and people who educate and govern and lead the people, I dedicate these pages of murder and of blood." It is impudence like that of an intoxicated man, and literary criticism then would first begin on the basis of Mirbeau's physiology, with a laboratory report. Otherwise any criticism of his work is relatively worthless. One would need to find out if he represents atavism (reversion to a primitive type of mind), or if he is sinful because of the influence of toxins. Does he appeal to the wallowing part of the public for sympathy, or for francs? While his comments on the horticulturist show a startling interest in the simple flowers, his

comments upon simple virtue in social life show no such tender regard for preservation of the mind from harm. I presume that he presents stigmata of physical decadence which can be readily classified, unless he is a plain fraud. He treats of human perversions more zestfully than he does of flower perversions, and with an insight which we assume must have come from personal experience, to be felt so deeply and described so clearly.

One admirer says that Mirbeau has wanted to know the human reason for the religions which stupify, the governments which oppress, and the societies which kill. My explanation for the existence of all these undesirable institutions would be that they contain a certain number of Mirbeaus, and he has noted the effect of labors of men of his kind. The same admirer says: "No one has known better or more deeply, or has met more closely face to face with human masks, that sadness and that humor of being a man."

Masks are the hypocrisies which men wear to represent ideals which they recognize, but are not able to attain,—ideals nevertheless. They belong as much to nature's plan and to natural protection as does the shell of a hermit crab. Any one like Mirbeau, who makes cruel sport of taking shells from hermit crabs and leaving them to the mercy of conners should have his own masks removed by officials connected with a Burns detective agency.

When an unmasker pulls the carapace from a turtle and exposes the quivering interior he says, "Perhaps the miserable hypocrite had a heart also. Let us look and see if it was pulled out when the mask came off. Yes, here it is! And, what do you think? It even had sex organs and tried to keep them out of sight." The individuals seen by Mirbeau behind their masks were colored by his abnormal toxin (assuming for purposes of argument that he is not a fraud).

The poor intoxicated victim of an internal secretion may believe the world to consist largely of men like himself, degraded and repulsive behind their masks. Scientific criticism would remove the mask from Mirbeau himself. It would be necessary for the critic making a thorough study of Mirbeau to know the history of his real private life, and to know if his intimate knowledge of the bad was not from personal experience of the same kind. He is still at large, and there is no law which will lead to his confinement, for the reason that a law of that sort cannot be put into statute form, although the hospital of St. Lazare in Paris legally confines an injurious group of invalids.

Unmasking of a sort which we trust may belong to the stage of to-morrow occurs in Mrs. Annie Nathan Meyer's play "The Spur." Here we find both sides of the feminist question presented in a light so strong that opposite idea is revealed in its deeper niches.

Our learning of the fact that a single internal secretion when occurring in excess has a definite and classifiable influence upon the mind of writers is not so far away in the future. When Brown-Sequard first applied the idea of making use of an internal secretion therapeutically, and reported practical physiological results, the whole scientific world shook its head. Some men laughed, but more men looked sad "because of the fall of a great man." The whole editorial comment at that time was pitying in its attitude because of the apparent evidence of dotage in a scientific man grown old and continuing to be active. Editors said with regret that such men as Brown-Sequard ought to die or retire while in the height of their glory instead of going down with colors dragging in the mud. Am I overstating? Turn back to the files of your old journals and read for yourselves. Five years later a few venturesome experimenters were publishing reports of experi-

ence with the Brown-Sequard method. Ten years later it had shaken medicine to its foundations and had established one of the great advances of the century in the field of internal medicine. It does no harm to shake a profession or even all civilization, to its foundations, provided that civilization is strong enough to withstand the shaking, and with no more disastrous results than a sudden and forcible opening of doors and of windows.

My train is callumping along over the rails toward Boston. The news man has left in my seat the story of "a little sister," an arraignment of the grey hawk man. To be sure a certain woman is presented in shadowy chiaroscuro, but this is a literary trick for the purpose of appearing to be reasonable, and thereby opening the way for deeper penetration of the main innuendo. The story is written with all the cleverness and intensity of feeling of this particular authoress. Adding up my emotions later for obtaining a sum total, I find myself left in the nether empire of thought by this guide book, and with insufficient direction for getting anywhere else so far as the novelist cares. The book is not of service for taking me to an elevated point for better outlook, but it gets over the ground like a horse running away with a harrow, leaving neither a path nor fertile ground. Arraignment of man by a woman means incitement to class war. Those of us who are gallant will not bring up the question of the comparative goodness of men and of women, even though we believe them to be much alike; but a book of this sort may become one of the best cellars, because the authoress has dug deeply downward, and has featured the bad woman along with the bad man.

A story like that of the little sister is artistically and cleverly written by a writer who gives no obvious evidence of any special morbid influence, consequently we must place it in

scientific classification of literature as a book which was written for literary and counting house effect, by a writer who may be and probably is sincere. She presents a psychic phenomenon which we recognize as mental ingenuity. It discounts the opposite side of a question, and suppresses the image of conflicting facts. The psychic process consists in engaging all the faculties on one side of a question with intense interest, and suppressing the image of pro when it conflicts with con. Hartley Coleridge says that when the slave trade question came up for discussion by a debating society at the University, the lot fell to Clarkson to speak against it, although his sympathies were strongly on the other side. In the course of preparing himself by mental ingenuity for defending a side in which he was not interested Clarkson became so converted to his new reasoning that at the end of the debate he made the startling announcement that henceforth he was to devote all the power of his body and mind to the abolition of slavery. A novelist, finding the exceptional side of a question the more interesting side for the public, proceeds to make shrewd employment of that fact. It is my belief that the authoress of the little sister story could write quite as stirringly about a little brother and his experiences with certain women in smart society.

The key which may open the character of the writing of Mirbeau does not therefore relate to his work alone. It is a clue to the *raison d'etre* of some other modernistic writers. From the daily press or from intuition, these writers have learned that mankind is more interested in destruction than in anything that is constructive. Pick up almost any copy of a daily newspaper and we shall see that large headlines are devoted to matters of commendable sport and of newsy destruction, while small type is given to subject matter relating to the sciences, to blue sky movements, and to affairs that make

for betterment. The natural human tendency to take less interest in constructive subjects than in destructive subjects was grasped by modernistic writers, who exploit this trait of human nature for their own purposes. When suffering with toxic genius they write of destruction tensely, incisively, thrillingly,—all of the adverbs.

I have carefully observed the working of the mind of some of my French friends for the purpose of discovering the reason why they were fond of destructive literature. My conviction is that they care less for cynicism than for the cleverness which goes with it incidentally, and, following the bait of cleverness, are caught in the trap of cynicism. The process indicates the course of a fine quality which has gone wrong. It is one of those instinctive habits which furnish the weak point in a species leading to its destruction, and which is found among so many forms of animal life. The cynical part of French literature represents expression of the cenesthesia of a grand nation which has approached limitations, and which feels nothing of a future. We note the same thing among individuals in families that are nearing their close. The cynic is commonly one who has no children.

As a biologic literary critic comparing Rabelais and Mirbeau, I would assume that Rabelais had good physical health, and the fun of his coarseness simply represents crude literary expression of genius, just as man once used a club for his weapon. I assume, on the other hand, that the literary work of Mirbeau places internal secretion of a ductless gland upon his arrows, and a very little of this upon the tip of an arrow may kill, even though the arrow itself makes only a superficial wound in human sensibilities.

A very small group of exceptionally cultivated people read Rabelais as a genius. They see his grossness, learning, and wit, all of high degree, in a composite picture of thought

which had its place in the early part of the fifteenth century. When the monks got through laughing at Rabelais they found he had removed many of the pedestals upon which they had been standing,—such a wag was he. No one attempts to reduce his philosophy to any present-day code, or tries to fit his methods of writing to any system of to-day. If one jots down in a note book the comments which he hears relating to this author, the quotations chosen as a rule by the general reader will be found to relate to amusement at the extravagancies and vulgarity of Rabelais,—consequently we classify him as not belonging to the general reader. The test is that part of an author's work chosen for quotation by the majority of people. We must regard everything as harmful which leaves the general reader harmed, because he is the most of us.

Reading the list of great minds which have strongly influenced art or literature is for the most part reading a list of ill men whose physiology was abnormal. The history of their lives reads like a hospital report. The same is true of the creative geniuses in science, but not to the extent found in literature and art. In the monistic unity state, people will all enjoy and profit by the works of geniuses that are profitable. The only difference will be that in the monistic unity state children will not be told to follow the lives of geniuses as examples and as living guides. They will be taught not to emulate genius in any way whatsoever, but simply to use a part of the material for their own purposes. Whenever children have the misfortune to be geniuses, their individuality will come out anyway, for the true genius emulates no one. His vibration rings are his own.

We have all read the lives of great authors and artists with intense interest, without being impressed by the question of their illness. We put that question aside with a feeling of pity or of sympathy as a transitory feeling, instead of one

which should engage our attention at the very outset as closely as the thread of a screw runs to its seat.

Gould began to cut through the jungle and gave us perhaps the first vista toward a scientific basis for literary criticism when he wrote his "Biological Clinics." He treated only one feature of decadent influence, eye-strain, leaving out the more complex secondary complications, those of bacterial influences upon the mind from loss of efficiency of the protective organs. Nevertheless, no teacher of literature can be considered competent to-day until he has read Gould, making allowance for limitations and over-impress common to pioneers who have stepped into large openings and who have not had time to explore the recesses. Even with the Baconian method of inductive reasoning, good as it is, there is need for detailed exploration while collecting data enough for safe induction. Gould is pretty nearly correct, as far as he goes, with his laboratory-specimen authors, but he saw only one precipitating factor for their physical distress.

Botanists have recognized the fundamental influence of microbes in controlling the entire subject of plant development and plant destruction, from symbiotic root bacteria of alfalfa to walnut blight, but no one has dared to carry the same principle into analysis of animal life as applied to the highest animal and to his mind,—and yet there is a parallel which cannot be avoided. In going toward a definite point on a railroad track, we cannot go far with the wheels on one rail alone. They must rest upon two tracks. With our wheels on one rail already laid by the botanist, we can lay a parallel track as zoologists, and then progress very rapidly toward scientific literary criticism. The flower of the rose and the mind of man are things which differ only in degree when expressing the influence of energy upon matter.

Gould gives a list of geniuses suffering from eye-strain,

and his data cannot be controverted on that point as they are based upon writings and correspondence of geniuses and their friends clearly showing that factor. We find that a number of people in his list suffered from gastric and bowel disturbances along with the eye-strain. Gould, while recognizing the relation between eye-strain and gastro-intestinal disturbances, does not go on to give us details of this secondary influence upon genius, for the reason that little of such knowledge was at his disposal at the time when he wrote.

Imperfections of the eye represent one of the decadent features in practically all of the people in a civilized community at the present time. Eye-strain frequently influences the whole lives of geniuses primarily,—and also in the secondary digestive disturbances, to which neurasthenics are susceptible anyway. We must remember that the eye is one of the first organs to appear in an embryo, and in the beginning of development of some fishes it is the first thing to attract the attention of an observer. The eye as an extraordinarily complex and highly developed organ is so sensitive to decadent changes that arrested development of any part of the body is apt to be accompanied by arrested development of some part of the apparatus engaged in the function of the eye. Would the fiery, radical, and pugnacious member of a certain foreign Cabinet be less active if his eye-strain (marked by the elevated right brow) were corrected? Would he be as efficient if deprived of those irritating physical features which keep his forces alert, and in the end will have influence toward an exhaustion which may interfere with the sweetness of his nature and the geniality of his personality in private life? He is not likely to find any one in his own country competent to relieve his eye-strain, however, because the physicians of his country are not up-to-date on the subject.

Gould has given a list of authors suffering from eye-strain

and he ascribed their peculiarities to this fact alone,—which is not to be disputed excepting in part. We must remember the additional fact that sufferers from eye-strain usually have other defective organs at the same time. There are disturbances of metabolism from bacterial influence which still further make an impression upon their writings. The question is if these men would have done as well had they not been kept wide awake by the irritation of their eye-strain, and the dictation of their bacteria. Would they not have remained good, substantial citizens, powerful in the affairs of the world, but not geniuses?

The style of Carlyle can be traced along the different phases of his toxic influences. He began to suffer from dyspepsia at the age of twenty-three. Later his correspondence is filled with references to suffering from eye trouble and stomach and bowel disturbances. His "Sartor Resartus" was written before he became deeply poisoned, and his "French Revolution" indicates the degree of irritative stimulation of his genius. Sartor was in charge of his fundamental genius, but the French Revolution was in charge of toxic disturbances influencing that genius. His pessimism and antiscience in later years were typical of the scorpion sting of colonic bacteria.

It is said that Carlyle meeting Darwin in the street turned his back and walked away. Down went the whole theory of evolution—with Carlyle.

Darwin's cook thought that his appetite would be better if he exercised more. Mrs. Darwin objected to the view of the cook, who responded that she saw him sitting in the garden for two whole hours doing nothing at all but looking at a leaf. No doubt Darwin at this time was taking very violent exercise, more violent than that taken by the boy who is being chased by a policeman, but mental exercise does not seem to

oxidize toxins or result in carrying so much nutrition to the body cells as we obtain from purely physical exercise. Perhaps as much energy is transformed by mental exercise as by other kinds of physical exercise but the circulation of blood and lymph depend not only upon the driving power of the heart but also upon the mechanical massage of tissues which occurs in the course of muscle action.

Darwin and Huxley suffered intensely from eye trouble and stomach and bowel disturbances, but their literature is so purely scientific in character that it presents no occasion for specific bacterial reading.

The letters of genius in literature and in art sound the note of one long wail about eyes and bowels. The wail is that of the crew of a sinking ship. That is precisely what it really is in fact. A wail from the sinking. The geniuses are that part of humanity that is going under. Is there no ear acute enough to catch the sound and to know its meaning,—no mind with sufficient coordinating power to take us to the aid of suffering genius? Not yet! Preparation for such coordination is under way. Gould goes part way.

Dr. Oliver Wendell Holmes said that the best work in the world is done by men who are not quite well. He perceived a truth, but did not recognize more than a joke in it. He did not give us a description of what he meant by "best." We can sometimes know in advance if a social reformer who is about to become notorious is likely to present an erotic phase with his psychology. If any given reformer has a narrow costal angle and a high arched palate the more purely spiritual is apt to prevail in his mental method. If his sarcous elements are large and coarse there will be a larger proportionate physical phase to his propaganda.

Some of the world's greatest literary masterpieces owe their expression to the influence of specific bacterial poisons

in the minds of the authors. The works of Robert Louis Stevenson show an optimism due to the peculiar action of the toxins of the tubercle bacillus. On the other hand, the works of Nietzsche, Schopenhauer, and many of the French writers of the Nineteenth Century reflect the action of the colon bacillus or of anerobic bacteria. Microbes develop freely when protective organs lose their efficiency against bacteria, in the course of development of the doubling rose,—a decadent phenomenon. Some of the most famous painters or poets have been almost or quite brutal in their relations to the world at times when they were developing beautiful masterpieces. This represents action of the will becoming superior to bacterial action temporarily, while other bodily functions are suffering from the latter action.

The relation between bacteria and art or literature is a subject which science has not as yet marked for attention. The literature of any decadent nation becomes pessimistic in proportion as the protective organs of individuals lose control over bacteria which are depressing in their effect. In comprehending the subject it is best perhaps to begin with the toxin of a fungus microbe, the saccharomyces. Alcohol is the toxin which it produces, and alcohol has a well-known effect as a temporary agent of stimulation, stirring the brain cells into great activity. Toxins of other microbes, like those of the tubercle bacilli or of the colon bacilli, act like the toxin of saccharomyces, in producing their influence upon the mind. Each toxin has its peculiar way of acting. Some toxins intensify a man's normal mental characteristics, making the brain cells work more rapidly. They may inhibit the action of certain groups of brain cells, and act as a whip to other cells. The unusual associative faculty of genius is increased by the influence of toxins of certain bacteria. Just as a drink of whiskey results in brain cells being whipped into activity, so

toxins of colon bacilli or of tubercle bacilli whip brain cells into activity in their own particular way. Those who have had dealings with victims of tuberculosis know of their tendency to be hopeful and cheery. This illogical cheerfulness is often caused by poison of tubercle bacilli. On the other hand, the colon bacilli have had perhaps more definite connection with the literary world than have tubercle bacilli, because they find more victims. The poison of colon bacilli, however, affects the mind of an author in a depressive rather than in an elative way. The poison of colon bacilli is often depressive to the point of insanity, which may be temporary, clearing up as soon as overproduction of the toxin of this bacillus is stopped by medical means or by natural control. Under ordinary circumstances in healthy individuals bacteria are kept in check, and whatever toxins we produce are disposed of. Poison taken up by the blood is carried off to the liver and other emunctories, but when poisons are produced in excessive degree, and emunctories are inefficient, then it is that poisons pour into the blood, intoxicate, and produce their influence upon literature and all other works of man. There is no doubt but it commonly occurs that colon bacilli and tubercle bacilli are produced in excess side by side in the same individual, causing mixed influence, as in the character of Rousseau.

The fiction literature of contemporary France has been produced largely by physical decadents whose bacteria speak for them, but French scientific literature takes first rank as the work of healthy minds. The most highly developed nations have the greatest proportion of decadents at present. As England continues to become more and more developed we may expect bacteria to injure the function of organs more and more, its authors and artists will increase in number, and the effect of still more bacterial poison will show its effect

upon English literature. One of the symptoms of decadence is that self-expression which results directly in creation in literature and art. I never think of Nietzsche or of Schopenhauer as philosophers, but rather as men who are expressing the influence of toxins of colon bacilli or of anerobic bacteria. The civilized world at the end of the nineteenth century was flooded with pessimistic literature, but one is not obliged to take this literature seriously,—not for a moment. It is only bacteria talking when we come to a depressing paragraph, and we may put the book aside with a smile. We insist upon getting our material food in this century under safeguard on the part of the government and shop keepers. Are we to be as careful in this same century not to get our conceptions of God and the universe from decadents? Teachers will point out to us the literary shops in which good food is to be obtained rather than bacterially poisoned food, no matter how attractive its appearance. Not only toxins produced by bacteria, but antibodies created by our organs for fighting microbes, may cause a condition of the blood supply which stimulates the cortex of the brain in an unusual manner.

The world commonly holds that great authors succeed despite the poisons in their blood. We hear of their heroic struggles, but we must stop now and consider how many succeed, and to what extent, because of those very poisons. Would an empire builder like Cecil Rhodes have accomplished his great work if he had not been tuberculous? We do not know to what extent the *spirocheta pallida* has influenced literature, but we know that some accomplishments in history have been done by men in elative paresis due to spirochetæ. Extreme intellectual brilliancy often is a sign that a subtle poison has begun to work upon the brain cells. Just before patients become clinically insane the mind may work in a wonderfully brilliant way with exhibition of remarkable spirit

and unusual associative faculty, in cases in which we know the attack of clinical insanity is soon to be precipitated by toxic influences. Physicians know that we have a disturbance of the normal chemistry of the body when brilliancy in undue degree suddenly appears either from the influence of alcohol just after it has been taken, or from the influence of other microbe products which we can discover to be in excess by turning our attention to the subject, and having examination made by experts in that department.

Gout and the so-called rheumatisms appear to take their origin largely from microbe organisms of the colon group, and the point of view of gouty or rheumatic individuals must be classified on the basis of microbic sensitization of protoplasm. Bulwer-Lytton's morbid irritability and melancholy were undoubtedly due to microbic sensitization of protoplasm, and we instantly think in this class of Gibbon, Landor, Sidney Smith and Fielding in literature. Their thoughts were given scope and direction primarily by genius, but then were compelled to various activities and expressions by toxins of their bacteria. It was in the very last years of Heine's suffering that his morbidly sensitized protoplasm responded by giving us the vibrations of his genius through a remarkable range of sensitizations. Of the elative group, John Addington Symonds writes from Davos, where he went when he was very ill with tuberculosis, that if he was doomed to decline, he could at least say that in dying he had a very wonderful Indian summer of experience. He said that the colors of life had grown richer, personal emotions more glowing, perception of intellectual points more vivid, and his power over style more masterly than when he was vigorous. He himself recognized it as a phase of his disease that he should grow in youth and versatility inversely to his physical decay, but did not recognize the fact that he was merely representing allergy to specific toxins

of tubercle bacilli. Stevenson wrote the "Child's Garden of Verses" when he was almost physically disabled by toxins of tuberculosis, but when at Vailima and in much better health he himself noted the absence of toxic stimulation under which he had previously worked. Under the influence of climate and life out of doors his bodily health and vigor were at a high level, and the tuberculosis process apparently rested. The quantity of toxins thrown out was then diminishing and he keenly felt the deprivation. Colvin says that during this year Stevenson found himself unable to do any serious imaginative writing and the consciousness of the loss caused him many misgivings. He wrote that he had come to a dead stop so far as literature was concerned, but in health he was well and strong, and that it would be six months before he would be heard of again at least. He died from apoplexy before another exacerbation of infection of tuberculosis had again awakened his literary genius.

Stevenson could more easily have written the "Strange Case of Dr. Jekyll and Mr. Hyde" because of warfare between his colon bacilli and his tubercle bacilli, but the real literature which endures through the centuries after all is that of the calm reasoning of an Aristotle.

Genius is due to lack of control qualities quite as well as to exaggerated inherent qualities, and this is also true of doubling flowers in horticulture. There is a lack of stamens, which become changed over into petals. There are more bacterial poisons which are depressing to the mind rather than elative, on the whole, but when toxic delirium comes on, a man's sense of well-being may be well marked, and this is noted by those who have charge of people who have cyclical insanity. When a man of this sort "feels too good" his physician is on the lookout for a sudden breaking out of a psychosis of classifiable type. Wholesome normal thoughts are the result

of clean, well nourished brain cells. It is easy to discern the influence of psychopathic stages in the writings of Guy de Maupassant and Swift. The hallucinations of St. John the Evangelist and Cowper reflect their mental condition. In some higher types of mental activity we sometimes almost need the toxin of the tubercle bacillus or of the colon bacillus to complete the natural tendencies of authors who are being exploited by nature for purposes of display.

Lives have burned up, shortened by the toxins of microbes, just as we make brilliant green foliage and tremendous growth in a young tree by the addition of nitrate of soda to the roots,—a growth and beauty out of all proportion to nature's healthy balance. With the tubercle bacillus we have an influence upon the mind similar to that of nitrate of soda upon the roots of a young tree. The tubercle bacillus can give us unusual hopefulness, and the tuberculous patient may even die at the very moment when he is planning a great work. Jacobson says in his work on "Tuberculosis and the Creative Mind" that some patients become, as the disease advances, so ethereal that they suggest another sphere. Molière was able to act superbly in the theatre on the day of his death. Jacobson says that in the domain of art we have to consider for examples of tubercle toxin influence the cases of Raphael, Bastien-Lepage, Jacquemar, Watteau, Trutat, Habington, and W. H. Deverell. Among musical geniuses, Paganini, von Weber, Chopin.

Dr. Johnson says that the chief glory of every people arises from its authors. The initial feature of genius is doubling of the rose, but the toxin of bacteria is a stimulant which brings out morbid beauty, unwonted brilliancy of the rose, as nitrate of soda applied to the roots causes wonderful growth. Toxin is particularly apt to be produced excessively in the genius because of the mere fact of his being a double rose, and there-

fore lacking in efficiency of protective organs, and more apt to have poisoning from his bacteria in consequence, than are other men.

Shelley and Keats both suffered from tuberculosis, and undoubtedly represented the addition of influence of bowel bacteria, according to historical reports. The tremendous amount of work completed by Shelley when he went to Italy for his health in 1818 indicates the influence of this nitrate of soda upon his roots. The best known works of Hood were written while he was in the last stages of tuberculosis. De Quincey with his tuberculosis alone might have written still better than with the added influence of opium. We assume that the lovable character of Elizabeth Barrett Browning, natural to begin with, and intensified by a psychosis, was stimulated into great activity by the toxin of her tubercle bacilli which furnished nitrate of soda for the roots. Thoreau is an example of long continued tuberculosis influence. Rousseau's health began to show a breakdown after he was twenty years of age, at which time he had his first pulmonary hemorrhages. His varied moods would indicate a struggle for supremacy between toxins of colon bacilli and toxins of tubercle bacilli, unless his psychosis was cyclical in type. The best works of Rousseau in his enormous productivity belong to the period of his most active tuberculosis. The doubling of the rose in Shakespeare, as considered from a standpoint of his works, is further supported by the family physical history. His daughter died at the age of twenty-four years, and a son at eleven. His sister Margaret died at the age of one year, and his sister Anna at the age of eight, his brother Richard at the age of nine years, his brother Desmond at twenty-seven. The three grandchildren of his daughter Judith did not live to the age of twenty years. Shakespeare's lineage became extinct fifty-four years after his death. We do not know that

Shakespeare was tuberculous, or that he suffered from bowel bacteria, because history did not record such things, but we have evidence of doubling of the rose in relation to his genius with a customary parallel family record.

Concerning the influence of bacteria upon his literature, Shakespeare was not a genius because of his microbes. He was a genius primarily, but let us assume that when the genius was suffering from overwork he thought out King Lear, because at that time the colon bacillus had its trick at the wheel. It was during the microbe watch that he might easily have conceived of several of the characters in Lear.

I asked a colonic literary friend to give me his impression of this idea that Shakespeare might have been guided by colonic bacteria during the microbe watch when he constructed King Lear. I asked him to make comparison with his own experience. A day or so later we met again. He had thought the matter over. He stated that his mind at times of colonic disturbance would make the same terrible sweeps, the same exaggeration of good and of bad qualities in comparison of characters among acquaintances as might be found in the classic play. One difference that he noted between his own mind and the Shakespearian type of mind at such times was his personal lack of concentration sufficient for recording strong feelings. Shakespeare may not have recorded feelings at such times, but storing them up in his subjective mind, could have written "King Lear" later, very much as the artist puts down a sketch of his impressions, and develops it at leisure. Sibelius, the composer, admits that he receives his inspiration when he is intoxicated with alcohol, but never writes a line excepting when he is sober.

Wagner was delicate as a youth. His subsequent correspondence contains frequent reference to eye trouble and stomach and bowel disturbances. He was a man stung by the

microbe, and a physical sufferer. His entire music, from first to last, seems to express the colon bacillus type of influence. His great genius allowed his associative faculty to merge all parts of the music drama into a consistent whole;—no separate duets, arias, ballets, or ensembles. His text, music, action, scenery, all belong together. In his subjects however he reverts to ancient times, to the Greek drama founded upon mythological legends, and applies it to German myths and legends represented in "Lohengrin," "Tannhauser," and "Parsifal," or in the old Pagan mythology represented in the Ring. His music has no relation to the activities and the spirit of to-day, but relates to superstition and to myth. All the skill of his vast genius is directed toward arousing profound emotion, directed toward things—that are not! In order to enjoy thoroughly a Wagnerian opera, I have to use an effort of the will to place myself in readiness, just as one in future times may prepare himself for the love psychosis. Having enjoyed a Wagnerian opera to the full, I am left in a more or less morbid state of mind, not in touch with the world as it really is to-day; and it requires some hours for getting back,—for returning to happy daily adjustments in a real daily world. Wagner causes what might be called majestic injury, by his power to carry us back to morbid superstition.

A friend at the club says that my scientific basis for literary criticism would destroy the chief beauties of literature if its realistic and harmful trend were to be held as credible. Not a bit of it! Is the delicate beauty of the La France rose lessened because we know how it lost sex cells? Is the fragrance of the Jacqueminot lessened because we learn that thorns are characteristic of the *Rosaceæ?* Is it harmfully realistic to see that the glorious burst of crimson of the Rambler is gained at the expense of stamens? Does a knowledge of the chemical analysis of water lessen one's conception

of the sublime or beautiful in water when a dark green rolling breaker crashes and thunders against the foot of the cliff? For the pragmaphobe—perhaps! Walt Whitman belonged among the doubling roses. Visiting the hospital after a battle, he leaned over a bed and kissed a wounded soldier. The soldier resented it. So would I. Yet I can read his verse with intense pleasure; I can enjoy to the deepest his "Open Road" and his "Mocking Bird," but he could not have kissed me. He would have had to chase me several times around the table before he could have caught and kissed me.

Does it lessen one's interest in Plato to know that part of his love indicated a form of perversion? We simply drop that feature and learn not to follow him as a whole. "Platonic love" is sometimes employed to-day as a refuge for hypocritical sophistry. We need not look upon such a physical double rose as Oscar Wilde with disgust, but rather with admiration based upon a knowledge of his art as a whole. We can enjoy the beautiful side of his æsthetic propaganda. The doubling rose of great beauty grows out of dirt. Oscar Wilde said that truth threatens to destroy all literature. His feeling perhaps was that truth destroyed not only the false in literature but also such truth in literature as that of the Brownings. Such true literature is destroyed only for the pragmaphobe, who wishes humanly to fool himself. One can enjoy the Brownings and the Maréchal Neil rose and the opera Salome, if they are all placed upon a scientific basis for understanding. We do not lose the beauty of an author who is an hysteric, and who teaches the beautiful, any more than we lose faith in the clergyman whose ideals are such that he preaches at a higher level than he can practice.

Does it lessen the sweetness and melody, brilliancy and skill, passion, fancy and satire of Alfred de Musset to know that he was cyclothemic? Only for the pragmaphobe! The

doubling rose loses nothing by our knowledge of why it doubles. Better than that, the cyclothemic nature of de Musset actually explains away what the vulgar moralist calls his weakness, and leaves him a finer and stronger character,—an object for very genuine sympathy and admiration. What does it matter if his personality was freed by microbe toxin, so long as we have a knowledge of the conditions, allowing us to understand the thorns, and to engage our minds with its beauty? The hard-hearted moralist would point out to us the weak will, the alcoholic debauches of de Musset. As bacteriologists, knowing that he was ill and irresponsible, we may now have that infinite pity of the sort that sweetens all natures, when we know that in the depressive stage of his cycle, he suffered horribly from a dipsomania that belongs to manic depression, and is not subject to the will of any victim. He fled to Italy with a companion in misery.

The memorable flight of two ill geniuses to Italy is not to be used as a standard for action by well people, and calls for neither approval nor condemnation of the victims' points of view.

Was de Musset decadent? Yes! As the Blush of Gold rose is decadent, through no fault of the rose. The new basis for literary criticism is to lead our minds with a kindly light,—a light for which I longed from the depths of my heart for years, and which caused inward rejoicing when I perceived it through the impending gloom of modern literature.

It was no shock to feel that the inspiration of genius could be put on a microbe basis so long as this basis gave us the wonderful Frau Druschka rose. It will, however, at first seem as much of a shock to many people as a geological analysis of the sacred stone in Kaaba would seem to the devoted Mussulmans who kneel and pray in its holy presence, and let their tears of religious fervor drop on its blackened

surface. A certain number of people are interested also in its geology.

Does it lessen our inspiration when gazing into the blue sky to learn of Bieber's theory that the action of ultra-white light forms a thin bluish substance consisting of $NH_4NO_2 + H_2O$?

It is as much beside the mark to look for inconsistencies in the old classics as it is to look for inconsistencies in the life of Jesus. We have an excellent broad lesson in his abstract teaching that one can turn the other cheek when personally smitten, but not when the welfare of other people is at stake. Meek acquiescence does not belong to virility if other people are involved, but it may belong to generosity in personal affairs. The cultivated man confines his response to the attacks upon principles relating to common welfare. He may always turn his other cheek in relation to personal attacks.

Let us keep our old masters in literature with their crystals in varied setting. Let us keep our old masters in painting, with value shown by recognition in terms of dollars if you please. Let us keep our old masters in music. Who wishes to analyze the ideas of a dear and dignified old grandmother because she is superior to the follies of to-day and inferior to the science of to-day?

The works of depressing authors are read by two very widely separated classes of people. They are chosen by the morbid and depressed, who believe such books to be really true to life, but they are read also by normal people, who enjoy the contrast of view with that belonging to their own healthy lives. One group of morbid and depressed people reads books of heartening authors with great eagerness. There are many brave and noble double roses who possess whole libraries of inspiring elevating books, which they grasp in the spirit of the man who feels that he is sinking.

Young people are often distracted by seeking ideals among poisoned authors who are held up in fame among literary people. The student does not know which way to turn to choose the ones whom he should follow. Many of the intoxicated writers are possessors of the most hypnotic style, because of the intensity of their feeling. If one does not know which way to turn, he is always and forever safe with science.

People often look to a poisoned author who startles them with his intoxication as one who is to be followed. They leave the healthier books alone because such books are too much in line with their own safer thoughts, which appear to be commonplace.

It is not necessary to follow any author closely. We may abstract the beautiful and the good from authors whom we know to be decadent. When Ruskin writes of clouds, what care I for his physical decadence? We must be careful, however, when approving of the fine style of a writer who contains decadent spots not to follow style into trouble.

The exquisite writing of Anatole France shows the unclean refinement of gold which retains other metals, in his pleasure of presenting eccentric and immoral combinations in his characters. It is a pity that such an author just misses being a writer who would reach down the centuries as a classic.

Writers suffering from colon bacillus toxin often leave us in a stifling atmosphere unless, realizing that they are invalids, we get out of their rooms as soon as we have done our duty to their literature.

It seems a pity that so much of the swan song literature is expressive of depressive colon bacillus toxin, and yet that seems to belong to a plan in nature's scheme. Nature maintains balance in a way, by giving us nearly as much expression through the elative influence of tubercle bacillus toxin or of

saccharomyces toxin in literature, allowing the reader to make choice between elative or depressive types of literature according to his own taste. This allows people to classify each other readily on a basis of taste in their choice in letters. I often wonder if the colon bacillus modernist wishes to have his tender little ones read what he writes. If it is not for them, for whom then is it suitable? I forgot. He does not often have tender little ones at home.

In the monistic unity state any literature constructed by an ill man for healthy people to read will be published with a prefatory note relating to an examination made by the bacteriologist and the psychiatrist. The world when enjoying his views or making use of them for its own purposes, will not be misled as to the sources of inspiration.

Large minds, like that of Andrew Lang, can rise superior to the influence of literature, but smaller minds are attracted to this or that author, to their benefit or injury.

If a depressive writer affects a man who is strong enough to make reaction, and stirs him into action for bettering conditions, the depressive author then certainly is useful. It is my personal view that comparatively few men are strong enough to be stimulated in this way. The large majority are simply forced to lose more courage, according to my observation of readers of modernistic fiction.

If we look back for an object lesson among our friends, in order to note the influence of the novel, we shall find among them a few of the polite, the agreeable, the well-informed, but more often the skeptic, the cynic, the one whose faith in humanity is worn like a smile, flitting and evanescent.

The cynic and the skeptic are awkward skaters who have slipped when trying to learn the graceful art and sport of living. I would leave the skeptic or the cynic alone on his cold hard seat. We cannot help him until he has learned

better how to help himself. In literature, the wonderfully clever genius of a skeptical or cynical writer may challenge our admiration, but it does not leave us full of courage and of hope and of faith in mankind. It takes away all that is dear to us, all that is near to us, all of the spirit that fills our hearts with bright red blood. There is nothing in science which has any such influence. Science allows us a certain ration of hypocrisy, as a child is given candy, without considering it in the light of food. Science even allows us to observe the events in "L'Anneau d'Amethyste" without feeling that the subject represents anything more than traits as comical as one will see in a monkey cage.

Most of my acquaintances who read loads of "culture stuff" are always hungry for more. It does not satisfy like scientific literature, because of relative lack of permanent effect, and like alcohol leads to a desire for more and more pungent doses. It amuses, instructs, guides and pleases in a transitory way, but leaves one in a state of unrest eventually. We get to it with a desire to find rest, comfort, consolation for the moment, and it is like a game of golf in that respect. There is no question of the vast inherent value of "culture stuff." The point is a question as to its relative value and its prospective proportion in the literature of the future.

A study of the effects of oxidizing toxins will in the years to come open the windows and clear the house of very much of that artistic temperament which people morbidly assume they must develop in order to be cultured.

Modern pagan writers belong physically to the decadent neurotic class, and curiously enough they hail as classic Greek the literary characteristics which belonged to a period of decadence of Greece and its culture. The political and moral license which attracts modern allergic writers, who are pagans through the influence of protein poisons, represents the same

political and moral license that in the course of nature's plan undoubtedly belonged to allergic Greeks at the time when senescent protoplasm was bringing their cultural period to a close. There is no physical reason for supposing that limits were not set upon development of the Athenian protoplasm in precisely the same way as nature to-day sets a limit upon development of protoplasmic construction for every other group of plants and animals.

Neo-pagan writers of the present day, emulating the standards of conduct of pagan Greece in the days of decadence, are equally expressive of decadent personalities.

We may have a decadent showing himself extremely potent in many fields. Take Rousseau for instance. His gifts as a writer are of high order, although he was a confused and reckless thinker. His character was weak, essential qualities missing,—despicable in many ways. By his own account he had no morality, and was untruthful, treacherous, faithless, cowardly, sensual, and suspicious. An alienist sees in this conduct the marked evidence of progressive disorder of the intellect. He was really the victim of delusions of persecution,—and psychotic. There was an abnormally intense and irrational egotism, a greatly exaggerated self-consciousness. It may be freely said that he was clinically insane during the later part of his life at least, but an inspired lunatic. It was the contrast between Rousseau's nature, and what he observed, that allowed him to write on the beauties of nature or on pedagogy, without being schooled in either subject, in a way to attract the attention of deeper students. Rousseau was influential in precipitating a revolution, and he was himself divided up by internal struggles.

We have the same sort of character in Schumann. Even during the time of his life when he was making attempts to commit suicide (and finally succeeded), he composed classics

in music, such as "Papillons," "Carnival," and his A minor sonata.

God in His mercy (Nature in her kindness) arranged matters so that decadent writers would have no children or very few children. Things that are not proper for one's children to read are not proper for adults, as a general proposition.

I attempted to find some philosophy for explaining why writers so commonly seize upon the exceptional, apply it to general conditions, and then try to draw inferences about what we were coming to. Apparently it is a case of juggling with a good natural trait that has gone wrong. Is it not this search for the exceptional that moves the pioneer, that leads him and the traveller into all sorts of out-of-the-way places? His desire is to enlarge the boundaries of human knowledge and opportunity. The pioneer, and particularly the traveller, is extremely prone to tell "traveller's tales" about what he has observed. There you have it! The fiction writer is engaged in telling traveller's tales.

We must always remember that literature is not life. It is analysis of people under exceptional conditions. This is made by authors who are acting mechanistically in response to mutation instinct. They are unaware of the fact that nature sways them and us for a purpose, but we give nature's game the name of "civilization."

It is held by some critics that unpleasant realism is brought out for purposes of contrast as a trick in writing, to make the opposite side more beautiful, but the value of any test is shown in its end results. With Pierre Loti we have another example of the decadent writer who is exquisite in a part of his description, but who includes morbid hot house ideas. In "Mon Frere Yves" his descriptions of the sea are elevating, while his description of the habits of drunken sailors are depressing. We judge of the value of a writer by his end result. If he

leaves us elevated he is useful, if he leaves us depressed,—the contrary. "Whene'er a noble deed is wrought, whene'er is spoken a noble thought, Our hearts in glad surprise to higher levels rise."

Paul Verlaine and Oscar Wilde made strong efforts to develop the beautiful. Yet, if we consider the end of their work, can we at the same time picture them as having a large flock of rosy-cheeked, healthy children?

I always think of d'Annunzio and Verlaine in their search for the beautiful without regard for personal character, as poor sick things, in whom a hectic complexion often goes with wasting disease.

Imagine Verlaine and Zola brown and ruddy-cheeked playing football!

Detective stories are not read much at police headquarters because they do not appeal to men who know the real detective's life. To be sure "Robert Elsmere" is life, but such books are not called "literature" by the bell wether "founders of schools in literature."

When Zola takes his followers into the mire on a pretence of showing them the beautiful things on the other side, we must remember that he had the strength of genius, but most of his followers remained hopelessly in the mire, and all of them, even the genius himself, have remained more or less besmirched. Christ however could take even the little children all along His way without danger.

Realistic writers pretend that when the mire is shown, people will keep away from it. By the very act of remaining in it themselves they obviously give themselves the lie. Their idea of making the "truth" so disgusting that people will turn the other way and somehow manage to find their way to the beautiful, unaided (to something they have not been shown), leaves the syllogism with an indefinite term: "The truth is

disgusting. Something else is not disgusting. *Ergo,* we leave you to find your way to something else that may not be truth." We can excuse the mattoid Zola, who was ill and had no sense of humor; but how can we excuse the brilliant Bernard Shaw, whose wit lights up all sorts of corners? I probably know how to excuse him, judging from the basis of personal experience. In my own experience there are so many things I do not know, such abrupt limitations to my knowledge, that a natural conclusion from personal experience would place Shaw in the position of a man who does not always know where to look for the beautiful. It is one of the things which have been left out of his training. Elbert Hubbard however, who has very much the same type of mind as Shaw, is always finding the beautiful under every icon that he clasts. Both of them are naughty foxy wags and clever to the last degree; but one leaves us with a cinder in the eye, and the other leaves us with a pink in the button-hole when we depart for *chez nous* after a visit with them.

Christ said: "There is glory in the world. I am your brother; therefore come up higher with Me." Zola and the realistic writers said: "There is mire in the world. I am your brother; therefore come down into the mire with me." Don't you know which one to follow? No? Poor fellow!

Realism relates only to the individual, what he sees, and what his group of people sees. We can judge of the degree of decadence in a nation by the number of editions of bad realistic books that are sold. Christ was as much of a realist as Zola. The group of Christ apreciated the elevating elements, and the group of Zola appreciated the degrading elements. Zola thought it best to take his followers down into the mire in order to make a contrast for showing them better things. So many pigs are quite contented with mire however, that such a method is dangerous.

When we say that a novelist is true to life we mean that he is commonplace. There is almost no fancy of the well or morbid mind of man which is not carried into the realm of reality by somebody. Whatever comes into the mind of a novelist for purposes of description is quite as likely to enter the mind of someone for purposes of action. Esther Gosbeck of Balzac is quite as true to life as Antoine Bissette of Robinson; it is simply a question of what an author chooses to describe for his own morbid or sane purposes.

Writers do not often describe the great mass of people who represent substantial mean types. They describe the exceptions. This leads to wrong impression. I know personally many men in different countries who are engaged in plain trades,—carpenters, mechanics, men of that sort, who are able to turn their hands to all sorts of requirements with great facility. They read with an object in view of maintaining a position as representative citizens. They give thought and care to the question of educating their children, and of keeping peace in the family and town. Men of this sort really make up the great majority. They are the common sense folks who offer little of interest to the writers who describe the realistic, as they call it. The middle or mean type class is the best class in any country, from nature's viewpoint.

Realism has been simply one swing of the pendulum recording a single click in time. Human experience had gone far enough for the time being with affairs of the heart, so it swung back to the limit of affairs of the intellect. Now it is on the way again to affairs of the heart in the new uplift movements which are actuated by human sympathy. Back it will go again when too large a proportion of doubling roses take part in establishing civilizations. Some form of rationalism will represent the realism that we are now leaving on the return swing of the pendulum. Tick heart! Tick intel-

lect! Take your turns for ten million years more! Keep the wheels of time moving rhythmically!

We shall have more and more romanticism, because of the increasing number of abnormally sensitized individuals who ask of an author or of an artist, "Does he excite me?" The toxic-tension reader does not really care for beauty or for truth so much as he cares for a personal stirring of his protoplasm (grown listless) and a wish to have the emotions aroused violently, without regard to where they may settle down eventually. Synchronously with increase of romanticism there will be a return to the classical spirit as opposed to the romantic, and both will develop simultaneously. A scientific spirit meanwhile will progress likewise. For the past three generations romanticism has gained ascendency. We have felt that either the romantic or the classical spirit should prevail without alternative, and the question should be settled, but therein lay a fallacy. Romanticism, because of its very violence in appealing to the emotions, attracted greater attention than classicism, which works according to rule and glorifies proportion. In our newer classification belonging to the present cultural period, we shall place the romanticist in the pathological group most frequently and the classicist in the most normal group, making the question one of degree largely. One reason why the fine old classics have fallen into disuse in the college curriculum is because they belong to the stage of beautiful superstition. In our present fact-making period, we have little time for the old classics. We shall get back to them some day, but in different perspective, just as silver one day is necessary for currency and next day is used for a fruit-basket.

One thousand years from now of whom will people hear the most? Of Ibsen and Strauss, or of Phidias and Aristotle?

We can ride past group after group of date palms in the

desert without knowing how they can obtain water unless we are informed that the water table, out of sight, is not very far below. In the same say, one might read from Dante to Corelli without any intimation of the ground table of toxin into which the roots of literature penetrate, but the time has now come for learning the level of the ground table of toxin which is actually present in the protoplasmic mass of every individual.

If we make a modern classification of much of our popular literature and arrange it in acrostic form,—for purposes of augury the acrostic reads as follows:

Erotic,
Neurotic,
Damrotic.

The first letters of the lines portend the direction of this literature, and the middle syllable describes its character.

The proportion of poisoned literature is difficult of estimation. Neurotic literature may be very beautiful if stimulated by the tubercle bacillus. Tuberculosis, according to autopsy reports, occurs in one form or another and at one time or another in more than one third of all civilized people although in many cases it is overlooked, or at least does not appear as fully developed tuberculosis. The literature of the colon bacillus is depressing, and we know from the reports of the gastro-enterologist that an excess of colon bacilli occurs in at least as large a proportion of people as those in whom the tubercle bacillus occurs. Most people who have had some form of tuberculosis, or who are harboring an excess of colon bacilli are people who are nevertheless held to be those of ordinary good health in the community.

The neurotic novel displays various degrees of poisoning of protoplasm by the microbe, often enough with expression of discomforting theories. An author who gives us the erotic

novel belongs to a type showing considerable toxic stimulation of the sex cells, although the potency of erotic writers would seem to be impaired. As a class they have few or no children.

In looking over the card index of the New York Public Library it is interesting to note the character of books which are most often chosen for translation into other languages. It is observed, for instance, that the works of decadent writers of the present time are translated more often into Russian than into any other language.

Compare the writings of Hartman with the voice of a red squirrel. One is associated with sadness, the other with joy. Which one really gives us the more useful lesson?

De Maupassant wrote to please the corrupt element of fashionable life, and at the same time could write "Solitude" and "Sur l'Eau." The literary critic working from a scientific basis cannot know just how much of de Maupassant's writing was insincere, for purposes of money gain, and how much was genuine, in response to his microbe sensitization.

Fantasy often represents diseased cell action of the brain, giving wrong or bizarre direction to the imagination. Thus in literary criticism we may speak of alcohol fantasy as compared with opium fantasy, colon bacillus fantasy as opposed to tubercle bacillus fantasy, in people whose protoplasm is disturbed specifically. The monistic unity psychologists will work out and classify a great range of fantasies depending upon the particular influences which move brain cells.

When people are fond of mysteries, I always think of them as having gas on the mind, as I have often seen this love of mystery associated with capsulated bacilli in the colon, where capsulated bacilli really do form a large amount of gas. That of course is only a fantasy, but for one's own amusement he may associate the idea of gas forming bacilli with gas in the mind of a mystery-loving individual. At this point, my secre-

tary, an invaluable and competent critic, says that I am a prude in relation to decadent literature, and he further says that my inelegance in referring to the work of certain authors is quite as bad as the inelegant realism of Strindberg. Well, there you are! It is simply an example of the influence of these authors in leading one into the temptation of realistic writing. Let it serve as a warning, also as a reminder of a statement in the preface to my notes, that these are expressions of personal views only, without attempt at setting standards for anybody else. It has always been easier for me to serve as a warning than as an example. My secretary says that he was filled with all sorts of good thoughts on reading Zola's "Fécondité," but I was not broad enough to reach from bank to bank upon Zola's abutments, and found myself floating down the stream. I had to rig up some sort of mental anchor in fact, in order to keep any sort of position when reading Zola. All depends upon the point from which one starts. Had I been constructed for spanning the falls and rapids of literature, sufficient breadth might have been allowed me for reaching between pontoon anchors at least. My own literary taste was developed near the calm springs of scientific literature and of selected home reading, where one was in no danger of being swept far away from the birds and the flowers, even though he got in over his depth. My comments upon decadent writers, represent points of view of a plain surgeon, rather than any attempt at giving information to others.

The value of a book is likely to be inversely as the square of the degree of exhaustion of the author. Some men boast of sitting up nearly all night to work. I have done it myself for that matter in callow days, but had to do the work all over again, or should have done so. The thoughts of two o'clock

in the morning should seldom be allowed to go loose, to molest the public. An author who writes when he is exhausted is very apt to furnish morbid ideas, at least ideas which do not have the right ring. The best writer is the best man. The best man, according to Emerson, is the best animal; the one who eats best and sleeps best.

If one has genius, limitations are to be set upon his mental efforts—the limitations of physical well-being. If the genius works beyond his physical powers, the result produced is morbid, and its influence in the end very likely to be injurious. The genius then to be most useful is not to work beyond his physical strength.

The man who acquires morbidly sensitized protoplasm in exchange for fortune or fame is making the sort of trade that a horse jockey would classify in terms peculiar to his manner of expression, and quite shocking in print.

If a great fortune comes incidentally to a financial genius without injury to his health, it is well and proper. If it comes because a man is throwing himself into the bonfire he will leave sensitized protoplasm to his progeny, without benefits enough to compensate for the expenditure.

If you gain fortune or fame at the expense of sensitizing your protoplasm the character of which will be willed to the children along with other entailments, and if children and relatives are to fight over the property, are you really entitled to credit for shrewdness and wisdom? Are you not to be considered as having exercised the determination of a dog swimming to get a stick that is going over a cataract?

Authors and artists intense in their work are apt to labor for too long hours without regular nourishment or rest. I prefer authors who eat three meals a day, sleep eight hours and remain fit associates for children. That is a good healthy test for any author—remaining a fit associate for children.

Henry Ward Beecher is said to have weighed only one pound when he was born, and would undoubtedly have been a neurasthenic had he not developed methods in hygiene which gave him a strong physique to carry the brilliant mind.

Culture, literature, art and science will progress as long as their students work without injury to health. Beyond that point a man becomes morbid, does not ring true, and is prepared to give the world decadent progeny as well as wrong products of the mind. The less natural one's physical life, the less natural is the soul, and those who express the most extravagant ideas of the soul are often those who are least fit by physical constitution.

The chef of art and literature has served up for our delectation heated brains, frozen brains, brains sautée with alcohol and drugs, scrambled brains a la Métaphysique, and brains that blacken the silver service with their toxin. Excepting when we have company at the house let us depend upon plain natural-flavor brains with oxygen, for our every day pabulum. In this twentieth century we are to depend more and more upon things that will not hurt the children. Science and nature-study do not hurt the children.

We find more personal sensitiveness and vulnerability among men of letters and art than among men of science. The reason for this is because men of letters and of art look within themselves for standards, and men of science seek their standards from without. The force of criticism aimed at an exponent of letters and of art explodes within his inner works, while the force of criticism aimed at an exponent of science leaves his inner works uninjured and free to set about immediate rebuilding of his system of impersonal facts. There are, to be sure, selfish scientists who insist upon imposing their personality; and there are artists on the other hand, who are greater than their art.

Men of healthy genius, magnificent training and finest of balance abound in the army of science; yet they do not attract the attention of reviewers as do poisoned writers. A drunken sailor singing in the street-car attracts more attention than is given to forty-seven less exceptional though better people.

One reason why science does not have so many advocates as general literature is because its reasons are not turned into feeling, and the public is thankful to anybody who will serve as proxy for its thinking. The violent action of a mob, the popularity of a novelist with many editions, may be due to transformation of a very small number of reasons into great feeling. The scientist prefers to have feelings turned into reason, but the crowd prefers to have reasons turned into feeling.

The most acceptable fiction is "just what I would have said but did not have the skill or energy to express." It is not improbable that books on civics and sociology will largely displace fiction within the next ten years. Before the end of the century science may write the most popular books. Nothing else will thoroughly satisfy a public that is being upheaved by great new questions.

The novelist represents the type of mind which attempts to mirror the social world in all of its phases; but a mirror, no matter how brilliant for purposes of reflecting, is really efficient only as it is opaque, with a particular device in the rear for securing opaqueness. The scientist represents an entirely different type of mind, one which collects light from a wide field, concentrates it, passes it through the mind upon an object quite separate from its own genius. We may speak of this as the lens type of mind. The lens type of mind of the scientist, with its transparency, is then distinct from the mirror type of mind of the novelist, with its ordered opaqueness. Mirrors and lenses are both essential for the purposes of

civilization. The important thing is to avoid confusing the idea of one with the idea of the other. The mirror mind simply portrays what is obvious to the normal mind, while the lens type of mind shows potent objects which are too far distant to be measured by the normal eye.

Literature of the mirror type of mind amuses first and instructs incidentally. The instruction itself may be merely amusing, or it may be ennobling, or degrading, according to one's feelings after being amused or instructed. Literature of the lens type of mind instructs first and amuses incidentally. The instruction may be simply amusing, but is more often ennobling, and never degrading. That is the essential difference between the two kinds of literature. The mirror mind has its forte also in the drama. It holds the mirror up to nature, and incidentally reflects vice and virtue on the same plane. The lens mind does not belong to the drama—not yet, at least. It is focused for the purpose of magnifying its ideals for clearer view. It collects light from a wider field than the mirror mind does, and distributes it over a more definite field.

In a library, scientific books make the ballast, and fiction constitutes the sails.

Feeling on the part of some one propagandist may suddenly cause lighting up of public taste in regard to an author. This expression may be very distinct for a while,—only to drop back again without leaving much permanent effect. In France some thirty years ago, literary taste suddenly made heroes out of two romancers from other countries, the German musician, E. T. A. Hoffmann, and the American poet, Edgar Allan Poe. Both of these men were very much alike in their chief characteristics, possessing a high order of genius, living lives of dissipation, and founding fantastic creations

of supernaturalism which appeared to their disordered minds as realities. French readers chose this morbid diet for awhile.

Poe's cell protoplasm vibrated in circles of great diameter belonging to the degree of sensitization inherent in his degree of genius. The neuricity granules of his nerve cells having been expended in efforts at forcible expulsion of short-wave alcohol from the space-lattices of their protoplasm, he felt near to eternity, because his cells felt as near to dissolution as they really were. This gave mysticism as the keynote to his expression. The physical cell condition was reported to his mind and his mind in turn expressed the cell conditions graphically, in a literary way which is appreciated most fully perhaps by readers whose cells are lacking in their proper complement of neuricity granules. Nearness to eternity in the feeling of the mystic means actually a nearness to eternity of his cell protoplasm, and is a true and valid report. The feeling of nearness to eternity is, therefore, mechanistic in character and remediable through efforts at securing available nutrition in sufficient degree for restoring a normal proportion of neuricity granules to the nerve cells.

Poe's parents were both alcoholics, like himself and his brother. He had an imbecile sister and an insane uncle.

An example of exhaustion manifested in writing would be these lines from Poe:

> "Vastness! and Age! and memories of Eld!
> Silence! and Desolation! and dim night!
> I feel ye now—I feel ye in your strength."

Analysis of this expression of feeling from a scientific basis places it first in the department of mysticism. The physical brain-cells of Poe had become exhausted in trying to expel short-wave alcohol from the space-lattices of their protoplasm. The grand depth of feeling is expressive of nothing

more than what was felt by his personal protoplasm before neuricity granules could replace the ones which had become expended. His mysticism then was mechanistic in character, but genius allowed vibration of protoplasm still to occur in such a way that his consciousness recognized far distant effects as belonging to the condition of his personal protoplasm of the moment.

If we try to find a clue for understanding a character like Byron, we have to go back to the matter of toxic influence which caused his protoplasm to vibrate in great circles, but with conflicting circles. His romanticism and realism, courage, cynicism, aspirings, scorning, loving, and hating, show the interfering rings of vibrations of a protoplasm so highly sensitized that it responded to many external influences at the same moment. He was always conscious of immense energies which could not be brought into harmonious action by the aid of his intellect; and it is not improbable that, as in the case of Napoleon, the sensitization of protoplasm of his physical brain-cells had extended to a point beyond control by the intellect—presenting the features of a psychosis. It is on the idea of the presence of a psychosis preventing intellectual control of the rings of conflicting vibrations, that I would explain the conflict between the various phases of high waves of genius in Byron. Perhaps the presence of Byron's known physical defect is in line with our knowledge that psychoses so often accompany other defects that are more tangible in character.

"My whole life was a contest, since the day
Which gave me being, gave me that which marr'd
The gift,—a fate, or will, that walk'd astray;
And I at times have found the struggle hard,
And thought of shaking off my bonds of clay:
But now I fain would for a time survive,
If but to see what next can well arrive."

Byron's father and maternal grandmother were insane, and his mother was eccentric.

On reading the philosophers, from Hammurabi through Hegel to Hocking, I am impressed by the fact that all are influenced by methods belonging to the era of superstition. An esoteric atmosphere.

No matter how complicated or how plausible a philosophical author may seem, his book is false unless it leaves one better for the reading. Why does one feel that he must keep on reading pessimistic philosophers once he has begun? He knows they are injuring him, and yet he feels that he must follow them to a conclusion or he is a coward. He does not wish to be a coward in turning away from an enemy with whom he has grappled. Many people feel they must read a certain book because it is being widely read. It is not necessary that one read it, for it may be only a microbe record, but one may take it as he does a piece of highly flavored cheese after dinner (in which, by-the-by, the flavor is always developed by microbes), and a little may be harmless if taken in proper amount at the right time.

The East Indians laugh as they throw themselves under the juggernaut but it is not a laugh of life-joy, it is a death-joy laugh. Cynics who throw themselves under brilliant decadent literature, laugh. It is not the hearty laugh of life-joy, but the nervous laugh of death-joy.

If people of a decadent nation laugh at the same time when they despair after reading their novelists, it seems to me not the laugh of gladness, but the nervous laugh closely related to a cry of despair. Literature is an idol in France.

The idol death car of brilliant decadent novelists corresponds to the juggernaut of India. People hurl themselves under the juggernaut with cries of nervous excitement just

as they hurl themselves to destruction under the idol car of decadent literature.

If a book which gives you thrills causes no uplift with the thrills, your time is lost, never to be regained again in life. If you actually prefer such a book, you belong to the bonfire group, no matter whether you have training or no training, which led to the development of that taste.

If any author leaves you gloomy, pick him up by the nape of the neck and throw him into the waste basket. The red squirrel has no need for any such literature, and manages to get on very well.

The theatre which aims at box-office receipts as its ideal, the book which aims at publishers' royalties as its ideal must necessarily be injurious, in the same way that an irritant injures a surface already diseased. If the public is bad enough to insist upon having things that are bad for it, we have an evidence of morbidity belonging to unhealthy physical condition of the public.

As the June bug stung by a scorpion circles about in the most interesting way for observers, so Nietzsche stung by the colon bacillus engages the deep interest of many spectators as he circles about wildly with outspread logic.

The splendor of Nietzsche and his contempt for common things are the splendor and contempt of the intoxicated man who sees double stars, and trips up because of his contempt for the pavement; but there is good in all things, and Nietzsche is deserving of serious study as an epigrammatist at least, while we laugh at his drunken magician tricks with logic, based upon the cenesthesia of protoplasm which feels no hope of long survival.

Nietzsche was happy in his youth until he became a pathological character and an ill man through poisonous influences

upon his protoplasm by sensitizing toxins. The influence of bowel bacteria is most marked from the period of his first visit to Steinbad in 1885, where he went to seek relief from a catarrh of the stomach and bowels which increased until his final collapse. One who viewed conscience as an old woman's tale, was apparently not a celibate because of the dictates of his conscience, and Nietzsche's rigid celibacy undoubtedly had a physical origin, in line with the idea of arrested development of ductless glands as collateral stigmata of decadence. When we hear a wonderful lecture on Nietzsche we must remember that the views of his enteric bacteria are being reported, and we must have also a laboratory report upon the lecturer who is in sympathy with such ideas. Neitzsche's increasing curse of insomnia was probably due to high arterial tension from toxic influences.

There is a comical fallacy in the pleadings of Schopenhauer and Nietzsche, that nothing in the world is worth while, and we might as well give up. Rascals of this sort labor incessantly at writing books which will find publishers and bring applause. Why all this labor for nothing? The validity of their conclusions is disproved by their most obvious acts. Their willingness to labor in the interest of vanity of intellect is evident. Let the rest of us find nobler objects for our labors than seeking applause for tragedy which is not genuine. Let us put the matter in the form of semblance to a syllogism and see how it reads. "Nothing in the world is worth while. Writing is worth while. Therefore we pessimists write,—it not being worth while." The strongest of men when receiving a small wound in their sensibilities, which has been delivered gracefully, artistically and with skill, stop progressing so far as the soul is concerned,—they begin to stagger, and to run around in circles. The toxins of microbes sensitize the protoplasm of a pessimistic philosopher in such a way that it

vibrates in minor key. His protoplasm is quite human in every way excepting for the peculiar character of vibration in physical brain-cells excited by toxin of the colon bacillus. If we were not to look at the matter in this charitable way, we would say that pessimistic philosophers who publish books are vampires, sucking a dollar or two from the victim and then leaving him to bleed to death from his injured personal philosophy. The weak-minded and the young do not always stop to ask, "Why does he endeavor to write at all if all endeavor is useless?" Those who do not perceive the fallacy sometimes pay terrible, ghastly tribute to the vanity of a Schopenhauer or a Nietzsche. Every well man would be happy were it not for the confounded things that he thinks about. It is bad enough to develop unhappy thoughts for one's self, and worse to sell them for $1.98 at the bargain counter. We must give pessimistic philosophers credit for sincerity at least. Reading the published histories of their lives we note that records are made of their stomach and bowel troubles, corresponding to the stage of gloom.

After hearing a remarkable lecture on Nietzsche, it required at least two days for me to get back to normal balance and a good red-cheeked sort of judgment again. How about other members of the audience!

Let us compare Nietzsche and Stevenson. Both were distinctly geniuses to begin with. Both had decadent protective organs, and were obliged to be ill. The bacteria which got to the point of dominating, impressed their respective characters, just as *Diaporthe* or *Coprinus* impress their marks upon the trunk or roots of an oak that is losing vitality. If the tubercle bacillus had accidentally dominated the situation with Nietzsche, he might have penetrated us with transcendent sunshine. If the colon bacillus had accidentally dominated the situation with Stevenson, he might have left our bruised souls

quivering in the ditch. This is not necessarily true, nor necessarily untrue, and the latter statement is highly important. As a general statement the toxins of bacteria seem to intensify and stimulate natural characteristics, and I do not wish to impress the idea that any bacteria would make the selfish child permanently generous, or the generous child fundamentally selfish. The selfish child when ill sometimes does become generous however, and surprises the parents with a display of angelic traits. The generous child when ill becomes fretful and selfish, but I would not classify these influences as relating to our theme, because although really microbic in origin, they are very transitory. My belief is that Nietzsche with elative tubercle bacilli and Stevenson with depressive colon bacilli would have had their respective natural genius more or less smothered and the world would have heard from neither one—in the way in which it now knows him.

Not all kinds of tuberculous infections have the characteristic elative features, consequently we must consider that we are dealing with allergy in cases in which genius makes exaggerated response to the protein influence of the tubercle bacillus. Sidney Lanier was in transports of joy at a time when his family was suffering for need of the ordinary comforts of life. His biographers, speaking of his brave and noble fight against disease did not realize that he was unaware of any such brave and noble fight against disease. It seems to me a typical case of allergic response to the intoxicants of the tubercle bacillus.

We need not deny the idea that poisoned authors have genius to begin with any more than we can deny the fact that the drunken sailor who is singing in a street-car knows how to sing. No opera singer would draw quicker interest than this drunken sailor on the street-car. Hundreds of people read literature like the hectic journal of Marie Bashkirtseff who

would not read such a healthy book as "My Life as an Indian." Thousands read the beautiful but intoxicated Browning love notes who would not read the healthy and beautiful "Rosa Amorosa." A book of homely philosophy like "Uncle Lisha's Shop" is not read by many, and yet the editions of some morbid writer may run into the thousands. Many of these healthy books, however, remain constantly in print for years, while hundreds of morbid ones come and go like fevers.

De Quincey had an ordinary history as a boy, a model schoolboy until the age of seventeen, when he suddenly changed and became careless in his work. Later we find frequent reference in his correspondence to suffering from at least three conflicting intoxications. He is known to have had tuberculosis, which would furnish the elative element. He is known to have had eye-strain to such a degree that it presumably intensified stomach and bowel trouble of which he complained, and he undoubtedly used opium; but the symptoms as manifested in his writings are not the symptoms of opium, nor the symptoms of tuberculosis, nor those of colon bacillus toxins. We probably have in the case of De Quincey mixed intoxication of a genius. There are peculiar effects from the mixture of what are called adjuvants for alcohol. In absinthe, for instance, we have several forms of stimulants in small quantity, each one an adjuvant to the other. There is no one in sufficient amount to intoxicate in its own way, but all together produce a peculiar form of intoxication. In the same way we may assume that De Quincey was intoxicated by adjuvant poisons in addition to having a psychosis.

Confusion is worse confounded if in addition to microbe toxins a genius in literature uses other stimulants, and if to these are added the third factor of unmetabolized waste-product poisons during long improper hours of work. The output of the mind is bound to have morbid features under

these circumstances. Many authors are indeed unsafe for use by any healthy growing people. They appeal most strongly to minds similarly poisoned, and for this reason there has been more difficulty in forming anything like a scientific basis for literary criticism, but we are now on the right line. Balzac frequently used coffee to excess for fifteen or twenty consecutive hours of writing. De Quincey, in addition to his psychosis, tuberculosis and colonic toxins, opium and waste products, was drinking tea from eight o'clock at night until four in the morning when engaged in literary work. Coleridge used opium, and very many writers, classic writers, or at least famous writers, have used chloral, cocaine and hashish, to say nothing of excessive quantities of tobacco and alcohol, for "cementing their personalities" to use an expression of Reed's. De Maupassant has stated that every line of "Pierre et Jean" was written while he was under the influence of ether intoxication. Poe, Burns, and Gluck depended upon alcohol. Schiller is said to have written with a bottle of wine always at his elbow. Many of the greatest effusions of authors and many of the greatest oratorial masterpieces have been written with alcohol as the stimulant. The possessors of chemical brains give us pathologic creations, and no matter how grand or how beautiful certain of their lines or conceptions, they are to be classified largely from the hospital report standpoint by the literary critic of the twentieth century.

Reed, in the *Forum* for July, 1912, presents an excellent study of the features of toxemia as a stimulus in literature, and incidentally gives a philosophic description of the mental states which are summoned by writers. He speaks of effort at acquiring "systematization of personality" and "cementing of the personality" and shows how this is accomplished by methods and by drugs consciously, and through the influence of toxins in the blood without the genius's cognizance.

What I call "suppressing the image" of objects or ideas which conflict with the insight of genius, Reed expressed in another way by speaking of the "cementing of personality" through the employment of resources which eliminate conflicting impressions, and thus allow the individual to concentrate his mind upon an object to be attained. This is accomplished by one writer with alcohol, by another with coffee, by another with tobacco, all of which aid him in "cementing his personality" according to Reed, or in "suppressing the image of conflicting ideas" to use my favorite picture.

I had noted that sportsmen who were good shots in an open field could not hit a flying ruffed grouse in the woods because of interference of branches of trees with their vision. Men trained in the woods could hit these birds and did not see any branches when shooting. They saw only the grouse. For a long time I sought an explanation for this difference between sportsmen, and one day while shooting with my friend Dr. Kirkendall, the question came up. He explained it at once by stating that the woods hunter had trained his eye to suppress the image of branches. That was just what I wanted to know. The woods hunter suppresses the conflicting image of branches. The genius or the man of talent who rises superior to the interference of surroundings, upon his personality, suppresses the image of these interferences. He may do it through sheer force of will, or through the aid of prayer or of alcohol when guided by his cognizance. It may be done also through the influence of microbic toxins, without his cognizance.

Genius suppresses the image of grocer's bills and of noisy children, as a sportsman suppresses the conflicting image of branches when shooting partridges in the woods. On the part of the genius it is not an effort of the will so much as it is a result of defective organs of mental vision.

In the group of psychoses, hysteria being one of the most common, furnishes a greater number of writers to be classified under the department of psychoses. Cyclothemia is perhaps next most common among psychoses of the sort which lead to great mental activity, not separable from normal mental activity excepting by alienists who are trained to group together characteristics belonging to the psychoses.

During the euphoric stage of a comparatively mild cyclothemia mediocre writers may develop unusual skill in literary production, people of musical talent will rise to heights far above their normal range, a sculptor has rare vision, and business men will sometimes make fortunes with great rapidity, almost miraculously, in a way which their acquaintances cannot understand, although members of the family note other symptoms belonging to a manic depressive psychosis.

Alfred de Musset represents an instance of insanity of the cyclothemic group, but not having been charted by the bacteriologist and the psychiatrist, he was described by critics as a genius with a weakness for alcohol. In mild forms of cyclothemia or better developed forms of manic depressive insanity, only the members of a victim's family may recognize the mental derangement as such. In the period of excitement these patients take on an unaccustomed activity. They sleep little, and rest little, but do not show exhaustion. They take up projects with feverish activity; there is exaggerated gaiety, and often the most intense spiritual thought. They are loquacious—sometimes showing morbidly clear insight,—and such patients have been a marked factor in all human activities. After a while the depressive stage appears. The victims become sedentary, speak little, and seek solitude. They are sad and apprehensive without reason. They are conscious of their condition, but cannot modify it. The public sees these people only in their stage of exaltation. They are thought

to be eccentric, gay, and of wonderful activity, but acquaintances do not think of any morbid state as it is observed when the depressive stage is reached. In the depressive stage complaints of physical ailment are persistent. These patients go to various specialists, particularly to the gynecologist, also to the eye specialist, the nose and throat specialist. Mental healers and various other faddists have their share. Brilliant results are apparently obtained if treatment is continued until the depressive stage of the cycle is past, and the euphoric stage is reached again. These "results of treatment" are misleading in character, and represent only the completion of part of a cycle. Many of the nervous dyspepsias are a cyclothemic demonstration, and there are definite disturbances of the gastro-intestinal tract. Had this been taken as a cue, leading gastro-enterologist and psychiatrist to put their heads together, they might years ago have planned to make a study of the toxic features of the euphoric part of the cycle, and might have headed off the depressive stage or modified it from that basis in treatment. In October of the present year I brought this question before gastro-enterologists and alienists, all of whom expressed interest in the possibilities of a combination of their respective special studies, in its bearing upon psychotics.

In the cyclothemic constitution with or without definite psychosis, when there is a dipsomanic type, the periods of debauch are short, and interspersed with periods of great productive energy, often of such high degree of efficiency that greatest efforts are made to cure the "drinking habit," as it is called, in order to maintain the valuable efficiency of an individual. Recognition of the idea that the question is neither moral nor mental but simply bacteriological promises to make a great change to-morrow in our views about these cases. When a definite psychosis is present, the debauch is longer in

duration, and intermediate stages of great efficiency are much shorter because of physical injury due to the influence of alcohol.

Fruit injured by microbes, or by other parasites, ripens before its time. It ripens morbidly and decomposes, not giving us the full size or fine flavor that may be quite possible in fruit from that particular tree. That has been the history of genius among the people,—among all people up to the present time. There will be far more genius, far more talent in the future than has ever appeared in the past, but it will be greater, more perfect, and more full of flavor because of our understanding of the microbe enemy. We shall do with men about what the orchardist now does with his trees. There will be no more picking of a morbidly ripened pear and asking "Is this the best pear?" There will be no more picking up of a piece of morbid literature or of art, and asking if this is the one upon which to found a school. An understanding of the nature of the microbe and application of this knowledge to human affairs, will give in the future that large, full normal ripening of genius and talent which belongs to a finer nation. Advancement in civilization will now be made as fast as we recognize microbe as king, and no faster. Surgery recognized microbe as king, and shot far ahead of internal medicine. General medicine then recognized microbe as king and shot far ahead of surgery, in its preventive medicine. Just as soon as psychiatry discovers the ruling function of the microbe, it will shoot ahead of psychology and philosophy, provided that psychiatry is the first of the three to discover that microbe is king. Whichever one of the three, psychiatry, psychology or philosophy, first discovers that microbe is king, as surgery and internal medicine discovered the fact, that one of the three will step to the head of the other two. In the end science will be supreme, because science has never wanted to get away

from any fact, and has made obeisance to the king with due respect, politeness and dignity, from the first. To people who do not understand the microbe's power, it is just as much a mystery when an injured apple or pear ripens quickly, as it is to note that geniuses up to the present time have mostly been ill men. The microbe attacking the rose may give us morbid flowering in all sorts of extravagant types of beauty. So poets and artists have given us extravagant microbic demonstration, and we have not understood it, although plant pathologists have recently come to understand it in the rose. The stock farm first learned the necessity for adopting principles of eugenics. The horticulturist first learned how to avoid the influence of microbic action. Authors and artists have died while trying to express something they felt was within them and which would not come out, even though, like Schiller, they put their feet in ice water in order to drive blood to the head; or like Bonnet they sat in a cold room with hot cloths to their heads in order to congest the brain; or like Rousseau, who lay with his head in the sun and his body in the shade; or like Shelley, who lay upon the floor with his head to the fire of the hearth. All these methods stimulated brain action, but it was morbid. It made artificial ripening of the pear. Fundamentally it was microbic toxin all along which gave this feeling that something needed to be expressed, and which could not be expressed without the aid of artificial means for suppressing the image of confusing impressions.

When we emerge from this part of our cultural period, in which the sane and the insane, the sober and the intoxicated, are hopelessly entangled in the public mind, an entirely new field of literature will be developed.

Charles Lamb and Mary Lamb were confined in asylums on several occasions, and their writings are classifiable as belonging to various stages of their mental derangement. Poe and

Francis Parkman belong to the manic depressive group, with classifiable symptoms aside from drug influence. De Quincey's "Confessions" were written in the course of a few weeks when he was in a state of hypomania, but this had passed when the proofs were returned and he spent six months in trying to correct one volume. Coleridge could never complete his opium dream, "Kubla Khan" because he was interrupted while writing it, but the lines will remain as a classic example of opium effect. "The Castaway" by Cowper was the expression of delusions belonging to the depressive stage of psychasthenia. In Dean Swift's writings we find that morbid interest in disgusting things which belongs to a manic depressive psychosis,—as did his rage for obscenity and profanity. The literary critics speak of him as a case of "plain speaking." It was not that, but a brooding over horrible things and speaking with the intensity of monomania. According to his own statement, his object in writing "Gulliver's Travels" was to vex the world with that hatred—in allegory form—with which he regarded people in general and all of their occupations. He writes of his giddiness, deafness, and ringing in the ears, which belong to disorders of sensation accompanying extreme mental depression. He was commonly called the "mad parson" in England. Craik says that Swift's brooding melancholy derived strength and confirmation in a congenital malady from which he suffered. The ego in exaltation, expansiveness, and savage bestiality belonging to insanity, are plainly evident in the writings of Dean Swift. Both he and his uncle Godwin died "clinically insane."

The insane are by no means all confined in asylums. An army of the unconfined is doing insidiously perhaps as much harm as would be done more openly by the ones who are confined. We may often observe the morbid interest of people in "queer folks." Their sayings are listened to with rapt

attention and furnish topics for lengthy conversation by neighbors. The neighbors who give such close attention to the sayings of queer folks and who revolve these sayings in their minds to the exclusion of sane ideas, represent the mass of people who read the works of morbid geniuses in literature (and that means a good part of the entire reading public). They find little of interest in the substantial constructive writings of wholesome authors as compared with their interest in the works of morbid writers. This represents a natural tendency of mankind to apply the higher intelligence along destructive or profitless lines of thought.

That part of the new psychology which is called psychotechnics will be applied largely during the present century in promoting greater efficiency in criticism, in industry, in all occupations, in fact.

What is to be the future of art and literature? It will gradually lose that part which is associated with mystery. Mysticism is mistycism,—the inability to think clearly from solid foundations of knowledge. We shall have some great mysteries yet awhile, but great mysteries will be fit subjects for healthy normal genius and talent. Genius will not in the future believe mystery to be its greatest field. It will stop long enough to collect and arrange facts already known. There will be more and more genius and talent, carried to a point of still higher cultivation than at present. Not only have we picked up the early fallen genius who ripened morbidly, but we have been so impatient that we have picked all of the others before they had ripened and developed fully on the tree of knowledge. Just as philosophy through idealism tried to explain human action by a study of the mind, and in medicine psychiatry tried the same thing, so in quite ordinary affairs people judge others by their thought and

action alone,—stopping at that. Henceforth we shall ask "What is the relation of this thought or that action to microbe influence?" All has been confusion,—from matters of state down to the divorce courts or to the prisons, simply because the microbe has not been recognized as king. For this same reason divorces are increasing in numbers and proportion.

Philosophy has been a dangerously misleading influence at every institution in which only one philosopher was the leading teacher, but when, as at Harvard, two great teachers like Muensterberg and James happened to be teaching at the same time, and both on opposite sides of important questions, it allowed the student freedom to observe that something was at least incomplete, and to adopt his own methods in philosophy.

The reason why teachers of literature disagree with one another, and the literary layman disagrees with the teachers, is because certain essentials of literary criticism have been lacking in the past. There could be no full statement of terms because critics did not begin with the microbe for a foundation upon which to erect their pillars. Teachers have described the specific influence of one writer upon another writer, and the general influence of the period. They have collected personal facts and allusions, and have described style, method and expression of idea. This is presented by the teacher in a form of his personal academic science,—his art rather,—and with personal feeling like an actor, when serving as interpreter and illuminator. He presents it to whom? To a whole class, all at once. If literature means anything at all it means the depth into which each separate individual can dive to get his pearls. The teacher cannot show the class any pearls excepting the ones which he himself has grasped. We are still in the analytic stage in literature, but on the way to a synthetic stage. The function of the teacher in the monistic unity state will consist in his showing each student how to

approach an author in order to look for things which may directly concern and interest him. The method will be something like this perhaps, in describing an author:

"August Strindberg was a Swedish writer of the period when people tired of the level plateau which had been reached in literature, and began to search for mountain tops in the distant mists. Field glasses were turned toward Strindberg. He showed at once the dimensions of a genius. Some of the untrained climbers starting at his lower level, became confused in the muck. Others choosing a route more skilfully, ascended to elevations of charming outlook, but lost their way in the thicket of flowers and thorns before getting higher. None of them could describe him completely, for they had no chart. The bacteriologist and the psychologist have now mapped him, and we have a chart. The first landmark is his heredity. His mother was of the common serving class, and his father was worthless. The second landmark is his environment in youth. He was always in bad company when a boy, and without training on the part of good parents. The third landmark is his psychosis,—cyclical mental derangement of the manic depressive type, due to intoxication by the *bacillus divinogenes capsulatus*, which was not known at the time of his life. It was not isolated until the year 1970, although its presence was suspected in 1912. Writing during different stages of his cyclic intoxication, he naturally led critics at times where no one could follow, excepting the similarly intoxicated. An admirer once wrote of 'Strindberg's intensity, his determination to sift life to the core.' If we parse this last sentence and bring out the character of its metaphor, it may stand as an index of the clearness of mind with which Strindberg was heretofore comprehended. Things are not sifted down to a core. The simplest key to the chart may be found in his little brochure 'Have Plants Nerves?' In this we find a report

of investigation conducted in good order scientifically, and with rather well chosen methods, aided by employment of instruments of precision. From between the lines there radiates a poetic sympathy with plants, which attracts one instantly to a personality of high order. He was too near to being a scientist to offend us by offering untenable speculation. There was no trick for securing popularity, and at the same time no hardness of heart of the sort with which ultra-scientists steel themselves for purposes of avoiding error. Well may some of our scientific writers adopt his style as exemplified in this brochure. The poet within him allowed a delicate touch which pleases the refined taste with a modest summing up in the 'if not, why not' conclusion of his findings. (Incidentally this vision of Strindberg's is justified by the work of Bose who reports at the 1914 meeting of the American Association for the Advancement of Science that plants have tissues which correspond to the nerve tissues of animals. Such tissues in plants respond to external influences in the same manner as they make response in animals.) The next figure in the key is his play 'Miss Julia,' which represents the sexual erethism feature of cyclothemia. The whole theme of the play centres about this poor girl. Strindberg now is at the point in his cycle of intoxication where deep feeling is evoked for a fellow sufferer of another sex. It is the innate sympathy of his nature which in the play 'Miss Julia' is shown in comprehension of the character of her ailment. It is an example of the insane describing the insane, in a case in which both represented characteristic features of classified forms of sexual erethism. This play, however, like others of his plays of the same type, was taken seriously by the critics of the early twentieth century; some of whom thought they had discovered a genius to be admired, while others found the play empty,—as it really is, empty and noisy as a drum. To digress a bit,

publishers at that time had no hesitation in presenting such a book for sale. 'What!' they asked, 'Are we responsible to the public? No, sir! See our rows of fine substantial books unsold The world owes us a living. We have to sell people what they want. We are too modest to presume to have any taste superior to that of the public, and beside, we are tender below the belt in the counting house plexus.' The third figure in the key takes us to the depressive stage of Strindberg's intoxication cycle, and 'Confessions of a Fool' is a book for example. Here we have an explosion of his poisoned pride. The violent protest of abnormal sexuality, expression of passionate evils long endured, speaking in terms of romance with the timbre of the voice of vengeance; telling naked truths in a way to arouse the admiration of a reader who prefers to have lame naked truth stripped of any pretty drapery of illusions. There is loud expression of nasty notions without regard for the near presence of ladies and gentlemen. In short, we have in 'The Confessions of a Fool' what one may hear in almost any hospital for the insane, if he engages in conversation with the victim of manic depressive insanity at a depressive stage of the cycle. Poor ill Strindberg expresses himself with the superiority of a trained genius in honestly presenting insane views. He was confined several times in asylums for the insane, but the people of his day, and for some time thereafter, were ignorant of the fact that during much of his literary life he was as literarily ill as a patient with typhoid fever is ill.

"Like Dean Swift, he wrote much when he was actually clinically insane, and suffering from delusions of persecution. In the light of our present knowledge, any critic who takes seriously the women of his 'Marriage' belongs to the *catastomidæ*, and has been hooked with the bent pin of an acute crooked mind. A man with education beyond his ability to

control it becomes a destructive force, like a locomotive off the track. In the same way talent or genius when off the track, as in the case of poor manic Strindberg, becomes a destructive force. In studying Strindberg then, each student is to find his own pearls advisedly. The student with enthusiastic romanticism which colors the world and all that is in it with the gentleness of his own sentimental spirit, is to read with kindness, but not with that blindness which so often went with faith up to the early part of the twentieth century, when blinders were put upon horses and men in order to avoid the trouble of giving them better training. A student without romanticism but enjoying the beautiful, is to read Strindberg in full knowledge that a cantharis beetle stung by a scorpion is still beautiful, but his actions are abnormal. The student is to remember that brilliant Strindberg has been stung by the microbe of *bacillus divinogenes capsulatus*. A student without sentiment, and purely scientific in his literary criticism, is to put Strindberg simply in his classified list with the cyclic insanity group, and in the subdivisions of books and plays he is to make notes relating to each phase of the cycle."*

So much for the way in which the professor of literature of to-morrow will teach his pupils concerning an author. He will make comments upon the attitude of mind of the public in something like this fashion:

"In the early part of the twentieth century, the public was

*These notes referring to Strindberg were written before the present flood of press comments upon his books appeared. Few of the review notices that I have seen make any reference to his insanity. His ideas which belong to the depressive stage of manic depressive insanity are compared with normal ideas of reviewers, just as though insane ideas really belonged to this world, instead of to a mind that was not in this world at the time when the ideas were expressed. There has never been a moment when the need for a scientific basis in literary criticism was more apparent than in association with present comments upon Strindberg.

already very familiar with the history of contagious microbic diseases of the sort which manifest themselves in physical discomfort, but they were not as yet prepared to study the ones which caused mental discomfort. At that time no one would have paid two dollars for the privilege of sitting down by the side of a measles patient. People were too far along for that. Thousands, however, paid two dollars apiece to sit down by the side of an ill romanticist writer. It was dealing with contagious illness in both cases. In one instance the microbes would have made direct contagion, in the other instance microbes did make contagion, but insidiously, through a mental influence which was catching. In both instances the protective organs stood on guard for the people who were most normal. The ductless glands would have stood between the healthy individual and the measles patient in many instances, even though they sat together. The physical brain-cells warded off contagion from poisoned writers, for a certain number of wise people. It was only the ill, reading descriptions of the ill, who suffered very much. 'Who can minister to a mind diseased?' In literature and the drama two classes of the public can do it. First, the ill who attempt it unconsciously, with their sympathy in dollars. Next the curious. The latter do it with the same display of curiosity that has destroyed virtue more often than it has been destroyed by passion perhaps. It was in the young and awkward years of preventive medicine that people often fell ill of contagious diseases which caused physical suffering. It was in the callow years of literature, up to the early part of the twentieth century, that people fell ill of literature."

The whole philosophical structure of idealism, founded upon personal interest, cannot be moved from a fixed point without cracking its walls. Consequently, it is obliged to have lofty arches and spires in order to occupy much space. Within its walls are many parallel bars, swinging rings, and high trapeze apparatus for performers. The man at the door calls out that "Actuality is the thingness of the here, and the egocentric predicament, exclusive particularity, epistemological

monism, objective and absolute idealism, Bergson's anti-intellectualism, dangerous subjectivism, external character of relations, subject-object polarity, and things like that may be seen within." In order to be moved ahead the whole structure of idealism must be taken down and put aboard the cars of science from time to time, because impersonal science, forward moving, has never remained in pause excepting upon an occasional switch to allow a fresh engine to pull it forward again.

On the façade of the main hall of one of our universities there is a representation of metaphysical philosophy surrounded by the different sciences which are laying tribute at her feet. A more appropriate figure would represent the fires of science turning their products not into a condenser, but into a roaring gas pipe, open at the top. It is now time for a sculptor with vision to place on the façade of the main hall of some modern university a central figure of science carrying a hooded falcon. The latter is philosophy which is released only when game is actually in sight.

The reason why literature and the understanding of literature are so far apart is similar to the reason why the psychologist and the surgeon are so far apart. It is due to nature's insistence upon our progressing slowly, and setting each study at work expending energy upon its individual leash. Each study then pulls in its own direction with much waste of energy when moving the kyack of human development. If the student of literature, wishing to place it upon a scientific basis, were to sit down with a single book like Lorand's "Old Age Deferred," keeping in mind the idea of connecting the condition of ductless glands with literary expression, he would arise a jollier and wiser man, and prepared to take up the more scientific step (for his next step) relating to the influence of microbes upon literature whenever the integrity of ductless

glands has become impaired. He would then be in position to take another step toward the study of allergy, finally becoming qualified to make proper critical analysis of authors,—approvingly, pityingly, scientifically,—appreciatively at any rate. He would find that many of the men who have been called seers, saw only the unusual and the morbid with acute perception, and applied the morbid as "a discovery of value for the rest of mankind." Great masterpieces in art and literature are to be enjoyed as we enjoy the rose, but not used for substantial diet.

Literature is distinctly in a transitional stage from the time when self-sacrifice was a central idea, to the time when self-development is a central idea, although at the present time there is chaos in the course of change. There is to be new literature, new painting, new architecture, new sculpture, new drama. We shall not have to wait until the monistic unity state is organized, because the period of self-development as a central idea is now so far advanced. The times are as ripe as the pod of a jewel weed, and on the touch of almost any passer-by, there will suddenly spring forth a great new art and literature with its geniuses. The pod of the jewel weed is right now trembling in its sensitive elasticity, ready to spread the new seed, when our knowledge of the microbic influence on all human activities touches the pod.

Ten thousand years from now the twentieth century will be described by teachers of literature as the century in which men awoke out of superstition, or could at least state its terms. This was the century in which young men found they could follow the symbol of God with inspiration, because superstition which did not accord with their experience had been put aside. The teacher will state that the psychology of the nineteenth century was the psychology of an awakening man hearing the call of science, but taking a few little com-

fortable short snoozes in superstition before arising for bath and breakfast of the twentieth century. In the nineteenth century men did not realize that railroading developed as many geniuses as literature developed. The railroad genius, checked up by his directors, was kept on the track, while unchecked literary genius ran on the track or off it with equal display of energy,—in the latter case destroying its own rolling stock as well as the crops belonging to other folks. Tolstoy, Turgenieff, Strindberg, Ibsen, Zola, and Marx, all tried to pull the covering off from the dilatory napper, but they themselves were not yet over the effects of superstition of the night before, and the nineteenth century looked drunk to them. It really had not awakened enough to make critical analysis of the difference in health between homergic Macaulay and allergic Flaubert, homergic Dickens and allergic Aubrey Beardsley, homergic Dumas père and allergic Echegary. There is no doubt but the great genius of allergic mattoid Zola broke a line of tradition in French literature which had extended from Rabelais down to Montaigne and Molière; but Zola and his followers, themselves ill, found sympathetic characters among the disgustingly ill, and they could not keep step with homergic men of science, who were marching straight along briskly all through the nineteenth century. Many of the choicest character selections (choice from Zola's standpoint) belong no more to realistic life than do records of the annual reports of an asylum. Brieux relieves the situation in France by unflinching display of materials which in themselves do not belong to the morbid, but which, nevertheless, are tuned to the minor key of the negative. Brieux is really desirable for present consideration by the public, but only as an alternative for authors like Zola, who are less desirable,—pending the time when Christ at a second coming will be the alternative once more.

When approving of the Brieux play of "Damaged Goods" the public does not foresee that any letting loose of such a new power in theatrical idea is likely to start a flood which will carry away some of the restraining banks of social order. As a physicist more or less familiar with the action of sudden liberation of new power, I foresee the theatres taking up the subject and allied subjects and carrying them into the most revolting excess, before the public catches a foot-hold again and brings about corrective measures. The popular presentation of vice subjects on the stage and in literature does not call for general approval or disapproval so much as it calls for discrimination in judgment. The play of "Damaged Goods" may on the whole serve a useful purpose, but white slave plays showing how women are tempted to leave hard work and enter a life of ease will be gradually carried into the field of experimentation by many young people who previously did not know how. The human tendency to obtain experience adventurously and then trust to one's judgment in getting out of trouble, will always play a large part when young people are shown how to avoid hard labor. The willingness of a part of the public to enjoy what another part of the public considers to be wrong is exemplified in the story of the temperance orator who made up an itinerary and planned to take along assistant speakers. One man offered his services as a horrible example of the effects of rum,—he to be furnished all the rum he wished on the trip, free of expense.

Constructive realism does not consist in the telling of bad things which people already know, but in the telling of good things which people already know. Vice plays attempt to teach on the negative principle that young people should be taught how to spell correctly by showing them how badly a word looks when it is spelled incorrectly. The positive

principle of showing how good virtue is, will be the only winning principle until natural laws are changed.

The really skilful novelist and dramatist can fix the public mind upon whichever set of ideas he chooses; but it is vulgarly easy to fix the public mind upon destructive negative realism, because that is along the line of natural inclination of the higher intelligence of us funny little jiggers here on earth. The great dramatist of the chosen nation will leave vulgarly easy work behind and will fix our minds upon the good things which are already known, materials keyed to ring to the major positive note. That will be more difficult work, requiring greater genius than the genius of Zola or of Brieux. Greater geniuses than the world has ever seen are to come. They are almost here. They will leave the materials of Brieux and of Zola to be disposed of by a National Board of Health with its officer in the Cabinet. Our sense of proportion will not be lost, as it is now lost in the drama where a realistic dramatist believes it best to blow his nose at the table in order to prove that people really have colds in their heads,—and to make other people at the table seem more refined by comparison.

The vulgarity of realism rests in the ease with which it may be made to attract attention. I know all about it, because I tell shocking stories myself which are so funny that they would make a man laugh before breakfast on a rainy day. Under no circumstances would my shocking stories be told to ladies or children, because I am a gentleman to that extent at least, which the realistic writers are not. They insult me; and if such a free-living character as I am feels insulted, how about the more tender and flexible minds?

One unfortunate feature of realistic drama is that it arouses undue suspicion on the part of people who have not already been taught (suspicion is the greatest of all known crimes), and it does little to elevate the ones who have been taught.

It leaves people who have been taught, to find their own way out of the maze without showing them how to do it, and they consequently ask "What is the use if we are all in the same boat?"

The "unmasking" of people by realistic writers means nothing more than meddlesome destruction of our views of those ideals which the "masked" people were striving to attain as best they could under the circumstances of their environment. Realists rudely tear aside the inspiring illusion of ideals, as a boy would pull up the pretty sweet-scented pond-lilies and their gracefully rounded leaves, revealing the mud out of which they grew. "We will show you the truth, the real substance out of which these fraudulent illusory lilies grow, and you are now free to enjoy a sight of the truthful mud," say the realists. I am sure there are many masks belonging to my own repertoire. I want to deceive other people into being as good as they imagine me to be. Why are makeups donned for the stage? They deceive the audience only so far as the audience prefers to be deceived as a matter of choice. The literary unmasker, in order to be convincing as to his motives, should begin by leaping upon the stage and proceeding to remove the various appurtenances from Hamlet and Desdemona, explaining to the audience in tragic tones that only real people (like himself) were playing the parts.

The uncertain ideals and dubious technic of modern theatricals give little opportunity for wholesome vigor and means of expression of histrionism of high order. There are actors enough with temperament, humor, adaptability, fervor,—men like Crummels who have swaggering comedy in their walk and farce in their eyes. They have artistic comprehension, versatile philosophy, and wide knowledge of human nature, but the theatre-going public which places ballast in the counting house at the present time is largely morbid. A change

will come as soon as we separate divagates from the wholesome part of the flock and when theatre managers realize that a large part of the public consists of real folks who avoid the theatre unless they are obliged to entertain company.

Becoming so wearied of a stage which has cleverly exhausted all known social complications in the presence of its mirror, we descended into barbarism for relief in the early part of the twentieth century. This not proving to be satisfactory we tried mystery and the problem play. Spooky audiences responded, but red-cheeked folks did not like to pay two dollars for being found in that sort of company. Later on in this century the theatre will be devoted not so much to emotional social complications, to barbarism and to mystery, as it will be devoted to depicting social service, upon its basis of science. The thrills of the scientist in his whole field of activity will be presented before the public. A college valedictorian who had been unsuccessful in the practice of medicine called upon a very successful doctor who in college days stood at the tail of his class. The valedictorian asked "How is it, Henry, that you are so successful while I can barely make a living?" "I must run out now for fifteen minutes," said Henry, "and if you will look out of the window during that time, on my return I will answer the question." Upon his return he asked, "Now, George, how many people have passed the window in fifteen minutes?" To which George replied, "Oh, perhaps a hundred." "How many of the hundred looked like very intelligent people, of the sort in whom you would place confidence and whose judgment you would trust in serious matters?" "Well, perhaps ten per cent," replied George. "That is the percentage to whom you appeal," said Henry, "the rest are mine!"

Our methods of education and of training of the public are now reaching such a plane that the public as a whole will

turn with new enthusiasm to messages of science and of discovery delivered from the stage.

Literature and the drama apparently must for yet awhile present problems belonging to the decadent stage before they can be called great by the doubling roses in an audience. Drama of the present day consists largely of a featuring of unproductive emotions and productivities in life. One must see modern drama, enjoy it as he enjoys other contrasts,—but giving it proper value, not for lessons belonging to daily home life.

If the theatre to-day represents in such large part the decadent element, it represents what people wish, and that is an indication of our comparative weakness. The novelists who are degrading the nation's morals, women perhaps more often than men, represent what a large proportion of book buyers want. If there is at present a degradation of modern taste in art and literature, it is because the offenders are accepted by doubling roses as doubling roses of their own bouquet, and the relative proportion of people who worship the ugly give us an indication of the extent to which decadence has already progressed. The State can never exercise police control over the ugly in literature and art, because it is a creature of the people who appoint the police. If renaissance of public taste throws aside the obscene in literature and in art through modern education, we shall prove that our destiny is to be that of a still greater nation. We cannot curtail the right to freedom of expression in literature and in art, but we can curtail the proportion of people who increase the display of bad taste. That may be done by going back to a study of and control of the physiology of the nation. A healthy criticism in science and in art must depend upon the physiological health of people who are to set standards.

The painter, musician, orator, or writer, is a collaborator

only. He convinces no one unless he arranges thoughts which people recognize as their own.

The popularity of a play or of a book by a depressive author is a measure of the proportion of people in any community who are suffering from chemical influences belonging to a lack of proper hormones, from defective protective organs. These people go to the play or read the book, seeking justification for some of their own recognized characteristics which cause discomfort to the conscience.

People go to the decadent drama or read decadent books for the same reason that a tree toad and a chameleon choose colors of leaves and bark to which they can most readily adapt their own colors with the least degree of effort. People may be classified by the protective coloration which they choose.

The romantic school in literature needs always to be subjected to laboratory analysis for the purpose of classifying authors who show various degrees of toxic influence. It is indeed interesting to know what sort of illness causes an uprush of afflatus from the subliminal mind of any given author, in a school which is now to run the gauntlet of the laboratories for purposes of analysis. The classical school,—the ancient writers,—need not be disturbed at all. If one wishes to be iconoclastic for amusement, and with no particular object to be gained, he may to be sure have the privilege of asking if Pindar and Æschylus remain as champions of outgrown ethical systems and religions. He may ask if the patient Griselda, glorified by Chaucer and Boccaccio, would be approved of by the suffragists to-day. Even so alert a critic as Nietzsche chose to find Plato tiresome, and thought him more worthy of study for his style than for his reasoning. We may not wish to bring forward for use in Wall Street the philosophic quietism of Marcus Aurelius,

and his belief that the soul can conquer all external circumstances. Who to-day would read Thomas à Kempis for aid in renouncing the will, suppressing individuality and stifling one's ability? Did Spenser and Milton corrupt their poetry with too close adherence to the errors of their religion? Is "Pilgrim's Progress" repulsive in showing the terrible inner mind of an introspective fanatic? Did Aristophanes use his gifts to oppose progress? All of this sort of criticism is worthless in the light of modern methods, and serves no more useful purpose than the question if we are to read Shelley for the purpose of becoming convinced that we should become vegetarians and marry our sisters? One might as well take a cross-bow, a wooden cannon, and a battle ax from the museum to use in modern warfare, as to bring the revered old authors out for practical review. We love them for what they did in their day. They have full value also for purposes of comparison, just as paleosaurians become intensely interesting and valuable from the standpoint of comparative anatomy. I would not brush a bit of dust from the ancient classics, nor remove one link from their armor, for purposes of improvement, but the time has really arrived for shepherding modern literature, and for subjecting it to branding by bacteriology, physiology and psychology. Aside from the ancient classics having full value for purposes of comparison, there is a wonderful store of riches for those who know how to find them. They are heavy with crystals of thought, and are not to be discarded because fashions of thought have changed. In the same way the old classical composers will appeal for all time to the human mind, even though fashions change, because music of any sort liberates some kind of emotion.

If a man is fond of emotions of any particular kind, normal or abnormal, he will experience in the presence of music rapid

orderly liberation of what he finds joy in expressing. If he has morbidly sensitized protoplasm, he will liberate morbid feelings, under the influence of orderly vibrations of music which harmonize with his nature. If he has normal protoplasm and poetic imagery, he will liberate that sort of imagery. If he is fond of intellectual exercise, intellectual tracings will assume orderly form in his mind under the influence of music. Music then, simply causes vibrations which accelerate and put in order what a man ordinarily expresses more slowly and imperfectly,—muscle movement, emotion, or intellectual process. Music not only causes order, but also an intensification of these processes. Music assists in forming order out of those chaotic forms of consciousness which men are desirous of putting in order, but which they cannot do with facility in the midst of the common daily or hourly interferences belonging to environment. Music not only assists,—it forces. Religious order of thought is actually forced in the business man who goes to church with a mind full of affairs. The music starts him to vibrating in the line of expression of religious thought. Some of the psychologists believe that feeling stands first in order of expression of the human mind. They say thought is given for the purpose of expressing feeling; thought in turn being dependent upon physiological cell processes.

I sometimes have an idea that music may polarize consciousness. Its lævo action, let us say, causes the muscles of a horse to contract synchronously with certain effects when the horse prances in response to musical sound, or when he keeps step to its time. A dextro influence may cause the dog to howl in response to a given musical note. If thought is similar to the X-ray which is now known to be similar to light, varying only in wave lengths (an effect of atomic impulse upon ether), electrons of brain cells perhaps transfer

their energy to the thought-ray. The thought-ray in its turn communicates approximately the same quantity of energy to the electron which originates from organic cell matter lying in the track of the thought-ray. This is perhaps the direct cause of all thought-ray effects. When tension becomes of high degree in response to any compelling influence, music may perhaps ionize a path directly to some particular set of brain cells, and reciprocal effects may follow immediately.

The influence of music would seem to controvert the idea that thought is given for the purpose of expressing feeling in a way, because thought suggested by church music leads to expression of feeling which may not have been primary at the time. Feeling having been aroused in any way, often leads to abnormal thought, which is then arranged in order for justification of any particular feeling that has been aroused. Musical vibrations are said to be powerful enough to allow a steel bridge to be set swaying by a violinist. The music of Wagner, futurist painting, and the blue pea of Mendel represent variation as it is occurring continuously in all organic life. Muratta has discovered that a color scale corresponds exactly with the scale in music. Sensitiveness to harmony in colors may be normal or abnormal,—and is susceptible to training. If any variant from the normal like the music of Wagner appeals to a large number of people, it indicates a tendency for that type of sensitized protoplasm to remain popular for the time being, but perhaps only in a transitory way. Music is not different from alcohol in its effects over part of its range of action. Alcohol or its end result products when coming into contact with the protoplasm of body cells will set them to vibrating in an accelerated degree. ($\mp = ma$)? At first there is orderly vibration like that caused by music, chemistry of alcohol harmonizing with chemistry of the cells to a degree which gives a certain order

and direction to vibrations. Alcohol is rather more chemical in its action than is music, which belongs more to the physical in its manner of exciting cell vibrations. Chemistry, to be sure, is physical in its nature, but there are features of any action which we may conveniently classify as chemical in contra-distinction to physical. We have to make such arbitrary classification, because the physical nature of chemistry takes us to Infinity and drops us off into space: and a predicament that is awkward when questions relating to practical comparison between music and alcohol are to be settled. The effect of alcohol is of the same nature as the effect of music insofar as it causes intensified and orderly liberation of personality. Vibrations of music are not so exhausting,—at least not so rapidly exhausting,—while the vibrations of alcohol cause exhaustion rapidly. The difference is one of degree rather than of kind.

A musician may be followed in the evolution of his soul by noting which composers appeal to him at different periods in his life. At one time Schumann will leave him unconcerned, while Mozart will appeal strongly to him, and later Mozart may seem antiquated to him, while Schumann's music may vibrate in perfect harmony with his state of mind. This would seem to indicate that his evolution is not influenced by the composers, but rather that the works of different composers correspond to his taste and his emotions at different periods of his life, or in accordance with his physical condition.

When Warfield speaks of Wagner in "The Music Master," the leader of the union asks, "Who was Wagner?" to which the music master replies, "Oh, Wagner? He was a scab!" One's musical evolution is not as yet under control by the unions.

In musical assemblages one finds refinement and culture in high degree, but, Lord, how many eccentrics!

Musicians often say that they cannot play in a private house because people are present who repel them, and take away their *Geist*. This indicates the self-centred nature of a beast. If he were really artist enough his whole effort would be toward bringing science to bear in his art and skilfully choosing a theme which would insidiously win over the inharmonious individuals.

A morbid production in music, in art and in literature is to be appreciated as morbid in nature, and may be a very remarkable thing in its way. When I heard Salome at the opera, it seemed one of the finest productions that I have ever witnessed or heard (fine in its morbid kind). It did not have such a bad effect as was popularly believed, I am sure, because the people who would be spoiled by the morbid features were already spoiled, and other folks were not touched. Two young ladies in the seats back of me during one of the soul bleeding moments were engaged in discussing the question about whether they should go to Lakewood next day or not. Two rural visitors whom I overheard talking in the aisle afterward, were very much disappointed. They had wanted to see something bad;— that was what they had come for, and for that they had spent good money. This pair of opera goers were too crude to appreciate the badness, and had missed what they came to see and hear in the opera which they pronounced "Sayloam," and of which they had heard so much that was unfavorable.

Opera, like drama, displays unprofitable emotions which are seldom featured and not often experienced in every-day useful life. In China, where people are not killed very much on the stage the theatre deals largely with intrigues instead. Intrigue is the pet distinctive sin in that country.

An epicure of the senses, fundamentally self indulgent, has eager personal interest in developing taste for the finest of

microbe products; the delectable ethers of cheese, game and wine, for instance. (Aren't they good, though?) Even with plebeian beer, great care has to be exercised by brewers in breeding a strain of microbes which will give a flavor acceptable to the epicure.

An epicure of the emotions, fundamentally self indulgent, has an eager personal interest in developing mental symptoms for the dreamiest of microbe products. The drifting mind of phantasy and ecstasy—how we do enjoy these luxuries! No one as yet is experienced in the development of microbes for production of special effects in the emotions, and we simply make use of the best wild products found among ill writers. An epicure of the senses finds great delight in a variety of perfumes from ambergris, which is a microbe product from ill whales. An epicure of the emotions finds great delight in a variety of dreams from ill poets. Neither an epicure of the emotions nor an epicure of the senses has any motive of benefiting his race when enjoying self-indulgence, so we must not take the poet or the whale too seriously when considering the actual intrinsic value of their microbic products.

The kinds of bacteria which are at work upon an author may sometimes be predicted in a way, from the author's views, before his laboratory examination is made. In other words, we may take thoughts to the physical laboratory just as we take any other specimen there.

It is a pity that botany lost its opportunities because no great mind foresaw what it would comprehend. While the botanists sat on their stools turning over thumbworn petals for purposes of new classifications, medicine ran away with bacteriology which properly belonged to botany at one original point of contact; and now bacteriology, which will comprehend perhaps the greatest single field of study in organic

nature, has progressed entirely out of reach of botany. Perhaps it was nature's plan to distribute knowledge over various sciences instead of allowing one science like botany to jump tremendously into the lead, overshadowing all else in science, as botany would have done had it kept control of what it owned naturally. I do not know how nature set about making this division of labor so slyly, in the presence of such really scientific men as the botanists. They missed an opportunity to add literary criticism as a department of their science.

When the bacteriologist very properly includes literature in his field, he may be able to predict about what an author will say,—for instance, (after laboratory examination) that Shelley would close his hymn to the Golden Age in Hellas with such lines as these:

> "The world is weary of the past,
> Oh, might it die or rest at last!"

He would know that Shelley's toxic impression would extend to that degree of weariness leading to an anti-climax at the moment where he intended a climax.

Meyers says that "Shelley's special gifts were no more by-products of Shelley's digestive system than the wings are by-products of the grub." According to my belief, his special gifts were really inherent, derived from inheritance and environment, but the potential energy liberated by digestive processes was directly responsible for keeping his special gifts in motion. Special microbes at the same time took a trick at the wheel and gave direction to his thoughts.

Admitting that the afflatus of the poet is divine, it is unsafe to accept it for our own purposes until we have a laboratory report stating whether it was divine by way of normal metabolism, or divine by way of some saddening microbe like the colon bacillus.

Ecstatic insight may be aroused in a seer by some momentary revelation due to decomposition of mackerel which he eats at a meal in excess of digestive ability. If he had eaten mackerel which had developed a colony of luminiferous bacteria (as often occurs in the South), he would have suffered from a particular series of influences, perhaps leading to a fatal termination. His ecstatic insight or death, respectively, would be due to the particular species of microbe which he happened to ingest. A laboratory examination of Shelley might have resulted in this report: "Tubercle bacillus under control, but colon bacillus in excess. If writing at the present time, he will give us depression."

We must repetitiously note that genius of men, and in plants, is actually produced by microbes. First, by the influence of the microbe in causing over-development or under-development of certain groups of cells. This refers to ancestors. The trend of mind of a genius in the allergic class is sometimes determined by his personal microbes quite definitely.

With the poets we associate the idea of illness, based upon life histories of the great poets whose histories we know. Furthermore, the works of the poets, no matter how full of genius or of beauty, do not seem to appeal so deeply to the healthy normal mind, even in the most cultivated people, as they appeal to the similarly ill. I know something of the health of a professor in literature at the college when told of his favorite poets.

It is difficult for a poet to write or for a painter to work if he is completely comfortable financially. Society makes great demands upon entertainable people of that type of mind—destroying them by a sort of smothering process. Freedom of spirit of the writer or artist is best shown when nature forces him into a narrow crack and then bids him exert him-

self to get out. The crack may be too narrow. He also is smothered. A mean position between the two extremes is one that will be chosen for people with talent when they are to come under control of the monistic unity state.

A sensitized artist, like an alcoholic, dies perhaps while trying to give full expression to himself,—the one in beauty, the other in words, and neither one does it to his own satisfaction. A scientist on the other hand, is satisfied with his day's work, while comfortably dissatisfied with the state of knowledge on the whole.

The artist does not always elevate his views above the appetite, sometimes concentrating them upon appetite, trying to make it beautiful. The scientist elevates his views above appetite at all times, and does not idealize it at any time.

A hopeful vista of progress at the present time seems to me to open in the fact that greatness of an artist or a writer lies in his ability to get away from himself, and to give expression to the feelings of all humanity.

It is said that an artist sees things through a temperament, but this is true of all of us. The subject attracts attention particularly in the artist because he presents exaggerated response to external impressions made upon his temperament, and he places them on record. The same thing is true of a writer, but it does not attract attention so distinctly as with the painter, because each reader takes the points of a writer more to himself.

Socrates said that he would rather hear a good description of a fine woman than to see her depicted by the finest artists, and he expressed a fundamental belief of many judges that art cannot rise higher than nature.

Ocular perversions of painters, and their hallucinatory obsessions are a result of toxic over-stimulation of their protoplasm, similar in that respect to the delirious ecstasy of

a poet. We may ask then why there are no schools of Cubists or Spherists among poets. It is probably because mimicry is most easily incited in the presence of a definite picture placed upon canvas, while the mental pictures carried by over-sensitized poets are not definite enough to become grouped in "school form."

When any small group of artists, sensitized in morbid harmony, try to found a school, ovisness leads a large number of others to follow in their lead for awhile, until the abnormal feature is perceived by the general consciousness of the healthier large number. The mimicry part then ceases or is lessened. For the past few years painters of landscapes and the adjuncts of landscapes have used a great deal of purple meadows, purple trees, purple atmosphere and clouds, purple pigs, and purple cows. Within the next ten years this feature of response to the violet end of the spectrum conflicting with red will be largely dropped by the mimics, because it originated in over-sensitized protoplasm of the retina of a few wearied individuals possessing genius, who needed to ease their retinas with the short wave lengths of that particular part of the spectrum which appealed to them in the combination of red and blue.

One reason why a fatigued artist reaches toward the violet end of the spectrum corresponds to the reason for a fatigued man reaching more and more toward alcohol. (Recent theory of alcohol action. Removes restraint which normally maintains balance of cell work. Relaxes organic cells which are making efforts of restraint upon other cells.) The shorter the waves of light the more sedative effect is produced upon the retina until we approach the ultra-violet ray. Consequently a fatigued man instinctively reaches for colors at the end of the spectrum which allow him to enjoy more and more retinal relaxation,—this influence increasing constantly as we

approach the violet end. In cases of hysteria among artists we do not know whether insensitive areas of the retina are due to a condition of the retina itself, or to a state of the brain behind the retina, but the effect is the same so far as our purposes are concerned in making analysis of their choice in selection of colors.

Very short waves of ether manifested in the ultra-violet ray lose any sedative influence and become highly irritating and destructive like pure alcohol. When one has lost the resistance necessary for keeping balance against the influence of different rays, short waves may produce undue impression. The artist then, it might be predicted by the expert in light, would express lassitude and irritation by employing a great deal of violet or blue in his color key.

The bacteriologist may report to the expert in light, and to the pathologist, findings which indicate that next week a given artist will respond to short ether waves on account of the influence of certain bacteria, and that during that week his paintings will be given too much violet or blue coloring.

An artist reaching toward the violet end of the spectrum, in order to gain ease for his retina from the short rays of violet or blue light reflected from his canvas, might really be coddling his retinal cells too much and leaving them still less competent to record the relative values of colors in a landscape. If he were to drink alcohol at the same time his painting would be invalid in character although truly recording his feelings. From this viewpoint, then, the deep feeling expressed by an artist in colors may represent bad chemistry rather than high soul.

Violet is chosen by many nations as a mourning color, apparently an expression of response to the short waves of light for those who are depressed. I am unable to trace the origin of the expression "the blues," but it likely enough has

origin in a feeling unconsciously named after the influence of the short waves.

In addition to a response to short waves on the part of artists who use violet or blue to represent their own fatigue, we have choice of colors due to other abnormal causes. There may be structural defect causing ordinary color blindness in individuals who are physically very strong and well. Another reason for choice of color not necessarily associated with lassitude or vigor, is due to insensitiveness of the retina, common to various phases of hysteria. Hysterical insensitiveness of part of the retina is an ordinary clinical phenomenon, and the insentitive areas occupy the retina at points which allow yellow and blue to be seen with greater facility. These areas occupy the outermost part of the normal retina, and consequently are the last to be influenced, whenever sensitiveness for the remaining colors has been obtunded at this common point for hysterical sensitiveness. Naturally, if personal feeling is to be expressed in colors, the hysteric with morning vigor may employ red when he is in a state of excitation, but he will show a fondness for blues and violet to represent lassitude later in the day.

The son of an artist tells me that one of his early recollections is that of his father asking him to see the blue effects in a natural landscape, and even chiding him because he was not able to see them.

When the artist's eye gets old, he "runs off color," as the saying goes, not seeing colors as younger eyes see them. An entirely different feature seems to belong to the impressionists. When they are criticized for the use of certain colors which other people do not recognize, they reply, "That is just what I saw in color anyway." This may be in response to either short or long light waves felt in the sensitized protoplasm of a class of highly susceptible people, to a degree not recognized

by other people whose protoplasm has a mean degree of normal sensitization. Does the artist choose colors by preference and paint true to color, or does he see colors not seen by others but true to his own impressions as he receives them? In considering the so-called accuracy of ideas of artists in a new field, from a scientific basis of criticism, we have an entirely new factor for consideration;—the question of degree of special sensitization of an individual artist's protoplasm which responds to colors in different ways from that of the protoplasm of critics.

The chaotic color and riotous composition in Turner's later paintings appear to represent the effects of alcohol combined with morbid toxic sensitization of his protoplasm.

One may ask why animals exposed to the long wave color red become more excited than when exposed to short wave colors at the violet end of the spectrum. Although colors of the violet end ease the retina chemically more than red end colors do, they do not excite the sensation of light quite so strongly. We pass from long heat waves through the medium light waves to the short chemical waves. It is probable that animals do not see violet so "conspicuously" as they see red. Red also may excite them in addition, not because of its wave length, but because of some appeal to the animal psychology.

People of the far East tell us that yellow stands for intellect. Their intellectual men seem to have their protoplasm sensitized to respond to wave lengths of that color.

Landseer added a little touch of red to his paintings just as one puts a dash of sauce on the roast before carving it, and all can enjoy his red. If he had spread sauce all over the platter and then removed the roast, telling us that impressionist sauce suggested a roast to the really artistic mind, we would then have the kind of satisfaction that is offered by some of our modern artists.

There is no pleasure greater than that of watching anything grow, because it represents constructive change,—no matter whether it is an idea depicted in oil by the artist, or leaves of corn in the field. When conditions are right for an artist's development of his idea, the picture grows greater and fuller. When we have a blazing hot day with a thunder storm at night corn grows tremendously. No matter what sort of growth we perceive, the very idea of observing construction of any sort gives an innate feeling of satisfaction to the best mind.

If one wishes to compare the influence of oxidized toxins with the influence of unoxidized toxins upon artists, it is interesting to make comparison between the work of artists whose occupation takes them far afield, and that of artists who are closely confined to their studios. The magnificent work of Carl Rungius with his animals, and of Louis A. Fuertes with his birds, is full of scientific significance, together with artistic quality, and every touch of their brushes indicates untrammeled mind following free Nature. What health in the sketches of dear Dan Beard? Cubists and Spherists on the other hand, show the influence of unoxidized toxins in blurring the mind.

Some of the newer schools in art pretend to be superior, on the ground that they express feeling rather than things which are vulgarly observed. Heaven help a layman who tries to follow the feelings of four different artists, poisoned in four different ways! If the layman tries to be a cubist, or a spherist, or a post-impressionist in response to the feelings of artists who are post-microbists, or post-absinthists, he will indeed wander far from home in sound art criticism.

This afternoon I went to see the Post-Impressionist painting and sculpture at the International Exhibition of Modern Art. One could easily recognize the germ of value which had been

forced into performing capricious pranks by instigators with ocular aberration and hallucinatory obsession. The salient color key was plainly at the lassitude end of the spectrum (violets and blues). Whenever the red end of the spectrum had been employed a garish effect was the result. The staring presentment of drawing in some instances was of the sort done by children, Indians, and the insane, whose response to impression finds a primitive sort of expression in crude outline drawings. There was none of the simplicity of great art, but rather the simplicity of arrested development or of infantile type of consciousness. I had always supposed that the poetry of art held mathematics in the light of an hereditary enemy, yet here, right upon the very escutcheon of the Post-Impressionist, we find emblazoned cubes, higher curves, and conic sections. Many of the paintings carried the legend "Sold," but I have a lurking feeling in my subliminal mind that another word should have been added, or at least an exclamation point. Perhaps the dealers could tell us something of tricks of the trade in connection with these "Sold" placards.

Conception, misconception, peculiar memory and association of ideas, so often belong to allergic response that we shall in the future be able to classify many of their influences in abnormal cases, and go directly to the remedy. Percepts formed out of physical sensations of the allergic artist for instance, may not lead to concepts recognized by the customer for paintings. This artist will not interest a customer who is allergic in another way, or who is normal in his own percepts or concepts.

When the Futurist painters assume that feeling only should be expressed, they make the same sort of mistake that was made by Wagner, who insisted that music appealed to the emotions only. The monist knows that music consists of a

series of vibrations of the ether, and that the entire muscular and nervous system of a listener vibrates in harmony with it. Under the influence of these vibrations, muscular and mental movements become orderly and accentuated. A listener then expresses his personality in various ways. The horse as well as a man may wish to prance as a result of orderly forced nerve and muscle vibration caused by music. The monist knows that a Futurist painter's feelings may represent the effect of a mixture of toxins.

The Futurist sculpture at this exhibition left as much to the imagination as would have been left by wooden idols. The idea of suggestion through the aid of symbols has fundamental *raison d'etre,* but it leads the Futurist sculptor to sell stock of an unworked mine. It allows him to escape from any painfully long training, by alertly shifting responsibility to the intellectual apprehensions of his public. I would call it a sort of labor-saving sculpture, representing the simplicity of artistic indolence.

An editorial note in the March number of "Arts and Decoration" states that "Post-Impressionism, consciously or unconsciously, is being felt in every phase of expression." Alas! 'tis true, 'tis pity, and pity 'tis, 'tis true! It began first in the business world some years ago, with extensive sales of post-impressionist mining stock to widows and orphans, and to me.

As a plain matter of fact, the Post-Imps who would destroy art and literature, represent a pathological group. They see and feel what no one else can see or feel unless he is similarly ill. The dealers in art and literature will find a good many buyers who are similarly ill, because the psychasthenic condition occurs commonly. Its various psychoses may be appealed to with more or less success by fanatics and dealers at any time. It was inevitable that we should have in this country a display of the decadent element in art and literature

belonging to the older civilizations of France, Germany, Russia, Italy and England, for the simple reason that civilization carries along in its ambulances the weaklings and the ill.

Post-Impressionism is a term loosely employed for that whole movement beginning with Cèzanne, which turned away from the semi-scientific aspect of impressionism. It includes Cubists and Futurists. Cubism, as a particular form of Post-Impressionism, began with Picasso. Marinetti of Milan presented the first futurist manifesto only five or six years ago, although this simply served as a sort of fixed point about which a number of loose "ists" grouped themselves. The Futurist movement, however, appears not to have been formulated by any particular individual, but to have been a sort of synchronous rising of vapors from the decomposition of art in several countries—when the influence of microbe toxins had resulted in fatal attacks upon beauty, drawing, color, and composition. Cubism as first conceived was static, dealing with volume, displayed in geometric form. Futurism (Feelerism) deals more with movement, which in painting is represented by the combination of successive images on one canvas. The Cubists, however, are now losing their original form and are beginning to rise in vapor conjointly with the Futurists.

The subject of Post-Impressionism is more easily divided into classifiable parts if we show the definite form of mental derangement going with different demonstrations of the movement. Hysteria is perhaps more apt to show itself in the Cubist or Spherist schools, while paranoia on the other hand has a tendency to give us some wonderfully clear drawing. Hysteria occurs in the highly sensitized, and a high grade of artistic sensitiveness belongs to the highly sensitized, consequently it requires discrimination well planned in order to know where to draw the line between normal high grade sen-

sations, and a definite psychosis marked with its various stigmata, (which are classifiable by any alienist). It is quite essential that such distinction be made, because in using the term hysteria, I am far from having in mind any idea of reproach in criticism. In other words, we may place a label upon the artist. This one's label reads "mattoid"; that one's, "paranoiac"; another one's, "hysteric"; and still another's, "dementia præcox." By thus labeling each one of the specimens of artists we are enabled to classify them in the field of Art, beginning from the first Post-Impressionists, Cèzanne, Van Gogh and Gauguin. At the present time we are enabled to obtain data from the life histories of all who are engaged in the different forms of expression of Post-Impressionism. A book devoted to such life histories from the psychiatrist's viewpoint would furnish facts for guidance in criticism.

When the freshening breeze of scientific criticism from bacteriologist and psychologist has finally blown away all of these effluvia, we shall see upon the canvas nothing left but—canvas! When the Post-Impressionists are taken to the laboratory we may amplify the Socratic method of eliminating false conceptions and exposing sophistry by simply taking clinical histories, as we do at the hospital, in relation to people who are obviously ill. These clinical histories will first note the antecedents of an author or artist, the causes of death in his relatives, the occurrence of neuroses or psychoses in parents, and the history of grave disease of any sort, which may be obtained relating to parents and close relatives. Next will come the history of the artist's present physical condition, and the question of hidden injury from alcohol, syphilis, or diseases of childhood. Unless the critic in literature or art begins in this way in the twentieth century he will miss opportunities that are now within his easy reach.

The art committee at present finds it difficult at times to

explain to an artist why his painting is "skyed" at the exhibition—because he is taught that his gifts come from heaven—and not a word about microbes was ever suggested by his master. If the art committee cannot determine whether a certain painting is one of a great genius or is morbid;—if it aimed at the public or only at a group of artists, (art for art's sake), the matter may often be put upon a scientific basis by obtaining a retinal and colonic report upon the artist from the laboratory. When it can present him with a laboratory report from the ophthalmologist, the bacteriologist, the pathologist, and the psychiatrist, the art committee may have easier times,—provided that the committee consists of men who do not themselves require examination.

Normal committees will have great comfort in the monistic unity state, for their art criticism will be upon an understandable scientific basis. They will say to an artist, for instance: "Your allergic percepts were acted upon by allergic conception and formed into allergic concepts; then receiving contributions from an allergic imagination and allergic memory you passed into allergic association of ideas in this painting. Moving upward in consciousness you came to rest with allergic ideas, which were reviewed by your judgment and reason in a different way from the reviewing that has been done by those members of the art committee who possess normally sensitized protoplasm, or by the ones with allergically sensitized protoplasm." The artist, on receiving such a report from the committee, may look up and ask, "Hey? What was that you said last?" We must remember that a picture must be sensational in color and in execution in order to suit the perverted taste of a doubling rose among critics, and right here comes a responsibility to be placed upon the art committees. We have to determine that the protoplasm of their individual members is not sensitized allergically.

It has been a common tendency to praise the successful outcome of a struggle for self-expression on the part of an artist or writer who has been fighting against disease. We consider it ennobling, and it is ennobling, but we lose sight of the fact that he was injured in the struggle and his product may be no more desirable for substantial diet than is *paté de foie gras,* delectable as it may be for an epicure. The work of an injured artist or writer may be delicious as a part of our intellectual dietary plan, but its use requires a considerable degree of skill if the product is to be used safely for every-day purposes.

Too much of a good thing palls before long. I know of poets who exclaim and are sad because there are wells of affection in their natures which are never reached by anybody. That is because people are afraid to tap them—afraid that the affection cannot be conducted slowly enough for useful warmth and light. They fear a gushing forth of uncontrollable floods of affection which would make a great discomforting blaze.

The critical may say it would be a pity to carry this argument so far as to make ordinary people skeptical about the merits of sobriety and sanity. We might as well say it would be a pity to make them skeptical about the beauty of the double rose. Putting it in another way, sobriety and sanity supply every-day needs for the substantial household, but table decorations give æsthetic pleasure. Our geniuses are table decorations.

The tendency toward lack of good moral observation on the part of geniuses indicates a certain inferiority of genius as a whole. A man may possess creative genius, a mind of the first class, and yet not even make a good companion on a day's fishing trip. He may not be a safe man to leave in the house

without watching when the men folks are away. There is a natural feeling that excellence in one direction means excellence in all, but this idea applies practically to the individual of mean type who is well rounded in excellence,—and not necessarily to the great genius who exhibits exceptional excellence belonging to one group of faculties, with lack of development—a juvenile stage—of other faculties.

Children who are to become cultivated members of society are taught about people who wield great influence in art and literature, but we dare not let the children know how many of them would be unfit company for young folks.

Blunders of judgment are constantly being made in all walks of life because of the character of sensitization of protoplasm of individuals. Reason which manipulates judgment must frequently play the chords wrongly. This appears to be in nature's plan for preventing too rapid progress. Choice represents the final act of thought, and choice when going into action on a work of art, or a literary production, or a business procedure, gives the world a clue to the physiology of the psychology of the individual. The judgment of the world—of the public—is generally correct in art, literature, politics, economics and ethics, for the reason that mass physiology and mass psychology are maintained at a fairly mean level according to nature's plan.

After putting together all factors of the mind, the will is placed in final charge at the wheel. If the will is powerful, it may take the whole mind to destruction in accordance with toxic deflection of the wheel, of which the will is in control. This may occur with the individual artist but not with the whole public which carries a series of correcting compasses.

Centuries ago physicians made the beginning in methods for getting clinical histories of the so-called obviously ill. We

are only just now getting to know that microbes have as definite an influence in producing mental attitudes as they have in producing physical attitudes. Individuals who are to be subjected to analysis in regard to their mental phases must give full clinical histories of antecedents, and of their own present physical condition. It is quite true that many of the greatest advances in civilization have been made by geniuses who were insane. That has led us into the fallacy of assuming that genius necessarily represents value. Genius represents power only. It may be the power of deadening strychnine quite as well as the power of livening steam of divine afflatus. In the twentieth century we are to disabuse ourselves of the idea that genius represents value for which place must be found. We are to occupy ourselves only with those results of genius which are seen to be applicable in some field of utility.

Genius is the net result of nature's method for smoking out a family in order to get the honey. Along with the honey may be found bee bread, parasites, and other things which we do not want. We have naively considered that everything found in the comb of genius was honey, and that has led us to partake of many distasteful mouthfuls of things like symbolic literature and Futurist art. The psychologist as scientific critic of the humanities, will look his piece of honeycomb pretty well over during the present century.

After driving Post-Imps out of the Athenian Grove and into the laboratory, we shall find the question of their management simplified considerably, yet a new duty will then devolve upon criticism. We may anticipate that much, as belonging to natural complications of advancing civilization. Our new duty in criticism will consist not only in classifying Post-Imps as such, but we must then determine the particular kind of psychosis which is manifested in any individual or

"school" of individuals. The literature of Gertrude Stein belongs perceptibly to self-hypnotism, characteristic of hysteria major and of some phases of dementia præcox. The music of Schoenberg, composed by a man who has previously held authoritative position, seems distinctly that of some progressive mental disorder which can be diagnosticated by the alienist. The ideas of Freud on the other hand, might belong to the early stages of paranoia, or may simply represent that mental poverty which seeks to find panaceas, and which is characteristic of men whose education is beyond their natural limitations (if that is not an Hibernianism). The painting of Matisse may belong to the sexual erethism stage of cyclothemia, or to the irritative stage of dementia præcox in which sex symbols appear as phantasies. In a case of this sort the critic may have to await the contributory testimony which will come in due course of time, with later manifestations in the natural course of a disease. Display of talent or of genius is heightened during the irritative (toxic over-stimulation) stage of many of the psychoses, just as muscular activity is heightened by toxic over-stimulation of cortical brain centres during the early hours of a common cold. The generative or depressive stage then follows.

The characteristics which lead to Futurist art in painting are present in artists of many other kinds, and it is surprising that the disorder has not made its appearance in music more frequently. Perhaps we shall have a good deal of Futurist music later, and possibly more Futurist business.

The Post-Impressionist artists take us one step farther away from that true art which should belong to public appreciation, for which art is theoretically intended, unless one frankly admits he is engaged in art for art's sake. Those of us who are plain citizens, and yet enjoy art, have had trouble enough even with the old masters. Some of their works,

which they themselves knew to be of inferior quality, have famous names and correct dates attached nevertheless, and the canvases are sold at high prices, although containing nothing that is distinctive as belonging to the genius of any given master. Worse than that, paintings which fraudulently carried the name and date of a master have been extolled with extravagant praise until someone suddenly discovered their comparative worthlessness, thereby causing a painful subsidence in our æsthetic wonder over the genius of the master. Normal genius displayed in normal art will some day allow critics to judge paintings upon their intrinsic merits as works of art. At the present time, hypnotism and suggestion cause our faithful soldiers of the cause of art to see a cross in the sky very plainly at times.

The question of Post-Impressionism may be carried to a scientific basis for criticism in literature and art during the early part of the twentieth century. Plato recognized the difficulty in distinguishing between degeneration and progress, but could not find the terms for differentiating between the two. When he was troubled to distinguish between progress and degeneration, he did not have data to show that disharmonies, incoherences, and "perilous abstractions" might be symptoms of classifiable forms of psychoses. In Plato's day the microbe had not written "Mene, Mene, Tekel," on the wall. Twentieth century criticism allows us to take questions directly to the laboratory, whenever in the course of civilization a subject becomes too complex and intricate for ordinary understanding.

A predilection for disharmony is so characteristic of mental derangement that we shall probably be enabled to state the particular form of psychotic factor when making analysis of any one Post-Impressionist in his field of expression. The subsequent clinical histories of people who are engaged in

Post-Impressionism will prove or disprove this tentative hypothesis. In certain phases of many psychoses, the sufferers find harmony and satisfaction where normal individuals find nothing but disharmony.

Four psychoses are already recognized as commonly having an influence in literature and in art; hysteria, cyclothemia, paranoia and manic depressive insanity; but certain characteristics of Post-Impressionist expression which may be grouped together indicate that the early stages of dementia præcox may be responsible for some cases of this particular form of vagary. Art must have one of two chief purposes; art for art's sake, or art for the public. The Post-Impressionists have found some champions among the people—and incidentally it is worthy of remark that critical comments relating to the recent International Exhibition of Modern Art were made freely by the laity, while the technical critics were timid about venturing their opinions. The expression of points of view by the laity was for a large part on such a high plane that the various newspaper comments which were made by laymen should have been collected by someone, as indicative of the competence of the public to really express judgment upon the nature of works of art. Post-Imps were defended by a few men with an excellent display of English and of scholarly feeling, but there was no approach to that scientific basis of criticism, which is to be a later feature of the twentieth century.

One may read into a painting anything he pleases out of his own gracious and cultivated nature. He can find serenity, nobility, reticence, sensuousness—anything that he likes. The crystal gazers of India see in a glass ball prophecies of war or peace, good luck or bad luck—anything they wish to see in a crystal—when they have gazed at it long enough and steadily enough to enter into an hypnotic state. Anything

will do for an opening motive. There is freedom of the will in adjustment of mood when the opening note has been given in music, painting, literature, or any form of expression. A layman, not a sculptor, while contemplating a work of Phidias, may find an opening note for the expression of his own gentle temper of mind. A Cubist vase on a table may really serve the purpose which the opening notes of a fugue do with Bach. The self hypnotist then goes on with infinite elaboration and variation just as light hydrogen gas escapes freely whenever it finds a vent for escape. There is no doubt but modern harmony can expand to infinity; and Brahms, in his symphonic variations of a theme by Haydn, is quite at liberty to show different feelings at different times while using always the same elements. Some such idea was quoted by one or two defenders of the Cubists, but it was not quite fair to quote music when painting was under discussion. We cannot test the truth of music as we test the truth of poetry, painting, or sculpture, by making comparison with external originals, and yet in a way we may do so when grouping object lessons for getting at some sort of a basis in rational criticism. Arnold Schoenberg, of Vienna, formerly a professor in the Meisterschule, and a man of unquestionable standing, is now composing Futurist music, in combinations of tones which include false basses and incoherent transcription of emotions. He sees a logic in certain tonal relations which seem chaos to the ordinary hearer. Schoenberg purposely causes disharmony, disposing of melody and tonality, yet professing personally to find harmony in his cacophonies. It is amusing to watch the discomfiture of musicians over this composer at the present time. They made a mistake about Wagner and are dreadfully afraid of repeating the process in their estimate of Schoenberg. Were it not for the pathos of the situation i would be ludicrous. Is there absolute need for somethin

new in music? Is there absolute need for something new in marriage? Let the geniuses expend their energies for a century upon giving us larger measures of harmony in music and in marriage. After that there will be time enough during the next million years for making nervous and morbid struggles in a search for something absolutely new in either field. There is room for one full century's work in expansion of harmony. The search for something new belongs among the excitements, some of which are untimely, some of which are not sane in their motive. Let us now take another example of Post-Impressionism—this time in literature—some words of Gertrude Stein, as they appeared in the March number of "Arts and Decoration."

"It is a gnarled division, that which is not any obstruction, and the forgotten swelling is certainly attracting. It is attracting the whiter division, it is not sinking to be growing, it is not darkening to be disappearing, it is not aged to be annoying. There cannot be sighing. This is this bliss."

We are told that such words are strenuous, full of meaning, containing motion and agony, and expressing a vicarious livingness. They are said to be coherent for one who is in sympathy with post-impressionist expression. Now wait a minute—if you can. These lines represent simplicity itself in post-impressionist effect, being similar to the words of a man who is suddenly called upon to make an after-dinner speech. Such a post-prandial speaker often gives a post-impressionist presentation of things which he has in mind, but leaves the matter of coherence in idea to an audience which is presumably sober if not serious. What the speaker does hurriedly and with more or less valid excuse, the post-impressionist writer does deliberately with malcoherence aforethought, transcending the conditions of useful activity of the mind. Is this sort of writing really new? Have the

metaphysicians not pestered us with abstractions quite as perilous, for at least a century back? Did we not have a school of symbolic writers in France ten years ago?

The two object lessons offered by Schoenberg and Gertrude Stein, one in music and the other in literature, if placed alongside of a painting by Marcel Duchamp may give us valid premises for logically arriving at a right conclusion concerning the Post-Impressionist movement as a whole. When approaching our subject, we are to begin from the known fact that people who devote their lives to artistic expression have rather highly sensitized protoplasm, and are consequently more prone than others toward certain forms of mental confusion, when subtle and complex combinations of ideas overset their poise and balance of mind. In the form of expression of Post-Impressionists we find many typical features of dementia præcox, of hysteria, and of paranoia. The victims of these psychoses are characteristically given to disharmonies in expression in music, literature, painting, or in the daily adjustments in life. They find harmony where it is not perceived by a normal mind. During the euphoric stage of cyclothemia, as with other psychoses, talent, or even genius, may be lighted up with great brilliancy, to be followed later by the degenerative stage, in which an individual is incapacitated for any sort of useful effort. In cases of dementia præcox with a paranoiad phase we commonly find an expression of prurient idea, like that displayed prominently in some Post-Impressionist work. If a number of people in various fields of expression are shown to have one common characteristic of composing disharmonies, which are instantly recognized as such by the consciousness of trained critics, and if a predilection for disharmony is likewise characteristic of certain psychoses, the *ergo,* following a ready syllogism, is clear. This is not calling names, because mental derangement

is an honorable enough sort of illness. If we can demonstrate the presence of definite mental illness in a certain proportion of the Post-Impressionists, it allows us to hold the idea,—tentatively at least, that the leaders among these people are suffering from classifiable psychoses. Mimicry and suggestion may draw a number of fairly normal artists toward such leaders. Ovisness likewise exerts a force in holding various kinds of artists together.

It is probable that the Post-Imps could be helped through the aid of medical resources. It might be possible for a Matisse to be relieved to the point of his becoming a Rodin, a Corot or an Inness,—for the original genius is no doubt there. If, on the other hand, an expression of genius is morbid in original character and dependent upon the presence of a psychosis for its inception, the particular artist giving this expression would not continue to be an artist with notable talent—after successful treatment for his psychosis. We are at all times to avoid the fallacy of assuming that genius necessarily represents value for which place must be found. The privilege of avoiding that fallacy has not belonged to critics during the previous centuries.

Critics are seriously trying to understand the Futurist musical compositions of Arnold Schoenberg, and his cacophonies are now causing misplaced discussion in Europe. Some critics who are not painfully profound ask why people who are listening to the music of to-morrow must be obliged to listen to it to-day. Schoenberg uses Post-Impressionist stage settings to go with his music. Those who try to understand him say that he has visions of possibilities in music for which neither he nor anyone else has been able to find a right idiom. The alienist might furnish it. Modern harmony can be expanded almost indefinitely, but the difficulty is to keep it coherent and logical as it grows more complex. The chief

difficulty in placing Futurist music—unless we approach the question from the side of the alienist—is our inability to test the truth of music. We are spared pains in this matter, if the mentality of a mysterious composer is tested by accepted methods. Schoenberg tells us that his music is the honest transcription of emotions really felt, and says that the audience has no right to sneer at it simply because it conveys no emotions to them. The new composer really believes that he sees logic in certain tonal relations that to his audience seem chaotic. The critics of Post-Impressionism in music, as elsewhere, must now take all of these questions directly to the laboratory.

When in the course of rapidly developing culture and civilization certain phases of expression become too complex for our comprehension, we have the privilege of exercising a duty in taking these questions straight to the laboratory, and then basing our subsequent discussion upon the laboratory report. When studying the music of Debussy it is necessary first to study the life history of the composer and then associate his psychology with the basis of his general physiology, deducing a conclusion which relates to pathology provided that the collected facts warrant such a conclusion. If the collected facts do not warrant a conclusion of pathologic psychology, we are then in duty bound to make serious study and dignified criticism of the artist's compositions,—but first considering the physiologic question.

We cannot judge of the value of a new idea excepting by first judging of the man who presents the new idea in his relation to common questions and to things in general. The time when the psyche was a disembodied spirit has passed. That idea belonged to the period when each flash of lightning in a storm was caused by the direct hand of God. We now know that lightning is caused by the splitting of rain drops

which are falling through the ascending air current. The small drops with negative charges go up with the wind while the larger ones with positive charges stay below. This results in the presence of a region of positive electricity lying between the negative earth and the negative upper side of a cloud (Simpson). The psyche will be described in equally understandable terms to-morrow. If we find that all or most of the Post-Impressionists present well-known features of classifiable psychoses among the hysterics, cyclothemics, dements, or paranoics, or even among the mattoids and morons, we then have a scientific basis for right judgment in the matter. Many critics when seeking a scientific basis for judgment, have been in sad straits up to the beginning of the present century. During the last decade in the presence of Post-Impressionism, they have been almost in despair. The time has now arrived for taking unrecognized expression to the authorities in psychology and bacteriology forthwith, without any delay. It will clear the brain and allow us to escape from the effects of Post-Impressionist decomposition of painting, music and literature. The public does not yet realize that a certain proportion of people with talent present classifiable clinical psychoses. The question why so many men in prison become insane has very recently been reduced to a matter of knowledge that they were suffering from psychoses before becoming prisoners. They were really irresponsible for their crimes. Their true condition was not realized until they were placed under close analytical observation. It is now time to make a similar analytical observation of the futurists.

Is the world benefited on the whole when a morbid mind is displayed in the transcendental genius of a Napoleon? It is true that we have the Napoleonic Code with Justinian color, and that constitutional government was jarred hastily into

European states, but at what fearful cost! Yet that in itself may have been nature's plan.

Would civilization have extended just as far, more slowly and better, without Napoleon? That is the question we must ask. He had no burning desire to extend civilization for civilization's sake, but only as it meant power to himself. Had Napoleon been alone as a morbid ruler in his time we might answer the question more easily, but other nations also had morbid minds in power at that very moment. There was incessant warfare between double roses of the different European states.

Is the most famous double rose really finer than the healthy simple rose after all? By the gods, I do not know! Sit down by the side of a wild rose bush—and not vulgarly close, for it has tangible dignity indeed. It keeps one at an artistocratic distance until he has loved it enough to understand it. When one has loved the wild rose enough to take the trouble for really understanding it, he is then at liberty to hold its finest flower in his hand, to press the soft petals against his cheek; to drink the royal clear pink into his color soul, and to enjoy the fragrance that is not for the careless passer-by, but only for him who seeks it affectionately, and who finds it as a reward. And then the unfolding bud! There is exquisite modesty in its diffident advancement from the sepals which protect, even as the wise mother guards her beautiful daughter until the tender heart can bear the glance of a powerful but kind and generous sun, which might unwittingly do it a harm.

If I may have the choice between a wild rose and a double rose upon my grave, give me the sturdy wild rose that combines its colors with those of early morning sunlight in jewels of a thousand glimmering dewdrops, when the robin and the woodthrush are making the welkin ring with songs of life-joy and of praise for the coming day.

Profound is my feeling of admiration for Napoleon, and for the double rose, but let me ask if these represent the best.

Just as the logical end of culture is elimination of the race, so the logical end of vision of the poet, mathematician, philosopher, is elimination of the mind, because the one with farthest reaching vision is followed to the end by no one. *Ergo*, he is alone, and the vision is of value to no one beside himself, other minds having been eliminated *en route*. If his final point of vision has been reached rapidly through madness intensified by alcohol, or by microbe toxins, his visions *en route* to the final vision are morbid, no matter how well he describes what he sees. The more minds eliminated by a poet or philosopher *en route* to his own final vision,—the more minds turned morbid by a poisoned writer,—so much farther away is the product of that poet or that philosopher from really durable values in mind belonging to real life. Science, on the other hand, does not eliminate minds as a logical end, because science can go no faster than its facts. The scientist has visions like the poet or philosopher, but he can only be the general at the head of his facts. Alone, he would be of no more value than a poet or philosopher who had reached a vision alone.

Who shall decide the question if nature is superior to art or if both are superior to science?—

An eagle soaring high in air lets fall a quill which drops to earth. The poet dips the quill in ink and rises to the eagle's height. The man of science down below dissects the quill, so he may know where lay its power to swing the bird, on waves of ether overhead. The eagle, poet, man below, are circling now in plainer view. Not one is highest of the three, but different only in his way of rising, so we all may see, more clearly than we saw before.

CHAPTER III

Nature continually seeks to maintain a mean type in all forms of organic life, and the children of a supreme genius must not expect to be geniuses. Failure to recognize this fundamental principle of nature's persistent effort to restore the mean type, leads to much confusion. The sons of supreme geniuses are often placed in positions of importance, where they fail to hold on because of nature's insistence upon keeping a check upon development of *Homo sapiens*.

The children of supreme geniuses must expect to begin life for the family all over again, under the simplest conditions possible, because they are handicapped so regularly by injured-cell inheritance. If a man has supreme financial genius, and can make millions of dollars without losing meals or sleep, it is a good joke on the other fellow. His children may start off in good health, other things being equal. These children may then begin again to run the family to the point of developing another supreme genius in a few generations perhaps. If a financial genius loses meals and sleep over his work, his vanity displayed in such ambition plays a miserable trick on the children (if he has any), by leaving them a fortune that will kill their inspiration for work. He also leaves children a collection of sensitized protoplasm, which further incapacitates them for work. The fact that people would argue over this question rather than take out their notebooks and set down

the first ten examples that come to mind, indicates an intention on the part of nature to keep her plans hidden. The human mind is trained to resist the entrance of facts that are most obvious.

By "supreme genius" I mean the highest development of special qualities possible in that particular branch of the family. Sometimes we have a well developed genius followed in the next generation by supreme genius, and after that nature plans a reversion toward the mean type for that family.

A parallel to genius in man and an object lesson of nature's way for maintaining mean types will be found in the plant world, for instance in the pecan hickory. The tree giving us the San Saba nut, let us say, is a genius, and its son, the Texas Prolific, is perhaps a supreme genius. The Texas Prolific has wonderful qualities, but the tree has decadent sexuality. The entire race of pecans would cease at once if all pecan trees were Texas Prolifics, and if there were no other hickory trees for furnishing this variety with pollen. The progeny of this genius when planted have a persistent tendency to return to the mean type and to furnish no more geniuses. This is the history of all geniuses in the plant world.

Orchardists who know that fact plant pecans of the best mean type in order to obtain their most vigorous grafting stock. They do not plant very little nuts, or very big nuts for obtaining the most vigorous stock. The common fallacy, however, of assuming that genius will necessarily beget genius, leads to useless expenditure of thousands of dollars annually by men who plant pecans of the genius type. It is very well to do this when one is in doubt if the supreme genius of a variety has been reached in any given race of pecan trees; but one must be prepared to find nearly all of the progeny consisting of inferior types (inferior from man's viewpoint,—not from nature's viewpoint). Thousands of dollars will be

expended uselessly every year upon genius pecan seed, and for two different reasons: First, because dishonest dealers who know the facts in the matter will plant pecans, and sell the seedling stock under the name of the parent, for the purpose of taking advantage of the ignorant,—taking an advantage of those who imagine that genius will necessarily beget genius in the plant world or in the animal world.

Will the man who is held to be a healthy genius to-day be considered as a mean type individual five thousand years from now? Yes, probably! Take the pecan parallel again. Almost all the progeny of a genius pecan will be inferior to the parent, and inferior even to the mean type. Enough of the progeny, however, will be sufficiently superior to the mean type to allow of successive plantings (by artificial selection) raising the average of the mean type. The object lesson has already been carried to a point where we may use it for our purposes. Eugenics will make artificial selection of *Homo sapiens* in about the same way, finding its best material in the best part of the middle social class and not among superiors or weaklings.

The difference between the terms artificial selection and natural selection is after all like the difference between the terms spiritual and material, nothing more than convenience in nomenclature for purposes of academic discussion. If nature instructs man to make artificial selection, he follows the plan of nature. Therefore, when making artificial selection, he is making natural selection of divine order, under instructions.

We really march to the music of the grand diapason of nature's organ rather than to flute notes of individuals or of sects. Nature guides us, even though the heads of pins of our small personal affairs are held so closely before the eye that we cannot see nature as a grand whole.

When a family has stored up enough special qualities to fill one member with genius, nature then burns him up in order to get at his products, just as we wastefully smoke out a swarm of bees in order to get their honey.

A family is often proud when a genius appears in their midst. They should be sad rather, because it indicates beginning disintegration of the family.

It is in response to a well known law of organic evolution that the progeny of geniuses disappear commonly, or revert to primitive types, and have to begin the family all over again.

Curiously enough the word "descent" is used ambiguously by people who speak of descent from a famous ancestor. We note the word to be correctly applied by descendants of men who became great through activities that injured their health. We find children really descended, and in need of the doctor's care, much of the time.

The idea that remarkably fine parents will have remarkably fine children holds good only through the mean stages of development of a family. In the uncouth stage and in the decadent stage of a family, the child is not remarkably fine. At each end then of the cultural period of a human family we have a parallel to what is found at each end of the cultural period of a nation, or of a variety of plant.

It is the duty of sons of geniuses to look after their health very carefully and to avoid as far as possible trying to emulate their parent's example. People often mistake genius for strength when it may be weakness, allowing the mind to escape in excess at some point which other men would keep under control.

There is a careless tendency to blame the children of geniuses if they do not engage the thread of their screws in the social order sufficiently well to take them to good position. The situation is one calling for sympathy. The remittance

man is a type; usually a good fellow, well-bred, knowing the refinements, but not trained to any useful occupation into which he can fit. As the social world develops day by day, he has no screw point or thread to engage in any definite hole in which he can remain fixed and moving in unison with the progressive world. He has not been trained to take the place that is to be vacated by his father, because the father by gradual and slow adaptation fitted himself into a position which would require similar experience on the part of a son for filling a similar position. The son having been furnished with comforts, has learned no way for securing comforts. He often is handicapped by sensitized protoplasm, handed down to him by a father who has injured his own cells in the effort of obtaining and holding position,—and this handicap is a long one. His good-fellowship, founded in freedom from responsibility, leads him into all the enjoyable companionship of good-fellowship, and that is far from work,—far indeed from work. As a matter of fact, he has been admirably and systematically trained for elimination. Is it his fault? No! He represents the perfectly logical outcome of a system which is part of nature's plan for shedding the surplus. Are we not then to extend our sympathy? Indeed, I have always had in the depths of my heart as great a pity for the remittance man as for the girl on the street. Are they not all human beings like ourselves, calling for our sympathy in their misery? We note great waste in the social shedding of the remittance man. He is often of aristocratic lineage or at least of lineage denoting capacity. The remittance man has knowledge of the graces, of the humanities, and theoretical knowledge, at least, of the essentials for sociability. He could play a little trick on nature if nature did not purposely obscure the way. If he were to dig in the ditch or actually carry the hod, and not take one cent that he did not earn with shovel or hod, he then

would begin to cut a true thread on his screw, and to give it a point. The world would turn his screw rapidly enough toward a secure position, if he were able to face starvation by refusing to accept a cent not personally earned by himself.

Nature usually prevents the remittance man from doing this, because she really planned to have him eliminated. She cramps him in the narrow V of Vanity, and tells him that honor consists in begging rather than in labor,—in leaving unpaid bills, rather than developing a desire for meeting obligations like a good sport. Nature tells him that parents brought him into the world, and therefore they owe him a living. He understands this as meaning that they owe him money, when in fact they owe him theoretically nothing more than the physical gifts which they gave him to be used for developing personal earning capacity. Practically, however, we have to take as a parallel a hunting dog brought up in such a way that he is trained not to hunt. Under these circumstances the parents really do owe the remittance man money. They were at fault, and argument is confined to a question about the amount. That question is settled between individuals, or at least by one side. Theoretically they do not owe him money any more than the gardener is expected to hang pears on a tree. It is the gardener's responsibility, however, to train the tree which he has planted, and if the father and the gardener fail to train their respective charges, it is a fault, to be sure,—but one that is not to be remedied by hanging pears on a tree.

Ordinarily, it is not a question of fault on either side, but is simply a response to nature's plan. I knew one remittance man, a fine wild fellow, whose source of income was absolutely cut off. He went to work in a factory at earning his own living, and told me that for the first time in his life he was really happy. Incidentally he learned what true men are found in the shop. He said further that he was prouder than

he had ever been before, because he was doing what no one thought him capable of doing. Previously they had given him credit only for skilful construction of letters to his father, calling for money. He sometimes had to lie in order to beg enough to save his honor. Ordinarily, the remittance man will not labor because of social pride, like a girl who refuses to do housework,—preferring to become a prostitute. It is social pride that takes them both to where they find themselves.

The incentive to work in the case of a young man is usually punishment or reward. If he is born with money reward already at his disposal, nothing but fear of punishment is left for driving him into labor, as a rule. Experience soon teaches him that he need not worry greatly about punishment. Consequently, he fails to develop an appetite for work. The time will come when a system of pedagogy will take charge of this subject. It will show the young man things which are to be accomplished in natural science, and which he probably cannot work out successfully. His vanity will then be aroused and turned to profitable account, in attempt at working out problems successfully.

When Darwin presented his theory of the elimination of the unfit, many people who felt themselves to be targets became offended at feeling the hit. When Osler said that the best constructive work was done by men under the age of forty, and jocosely added that men past sixty should be chloroformed, many who felt themselves to be targets were hit, but continued to live and to be busy and successful nevertheless. Unfitness is a relative term, and has application in relation to two separate and distinct utilities. The navel orange is unfit for survival in nature's plan, but is extremely valuable for man's uses. The man who could express the sentiment of Dorian Grey was unfit for survival in nature's plans, but was extremely valuable for man's uses. Before

fitting the thorny crown of the word "unfit" to himself, a man must first stop to consider if he is not extremely valuable to his fellow men, even though he may not be destined for long survival of himself and his progeny in nature's plan. In further notes upon the subject, the ones who are being eliminated by nature will be called "Elims" for purposes of brevity.

A morbid inheritance is not by any means an inevitable handicap, in fact might give one a peculiarly good start in life, if brightness of mind and intellectual capacity were entailed. Among people with marked physical defects we often find compensating features of wonderful brilliancy of mind in some one or more directions. Many of the children whom I know who show physical stigmata of decline are more clever than other children in some one or more directions. Every man is both free and responsible to the extent of his capacity, no matter what has been handed down to him. We know of instances of neurotic inheritance in which the individual recognized his condition, and expended so much time and energy in physical development that he has excelled all of his companions because he had originally the finer mind. Cultivation of the will had a physical effect.

It by no means follows that a man with inherited tendency toward tuberculosis, insanity, or high cost of living need suffer from any one of the three. He can play merry pranks upon nature, and give nature a wry face of disappointment at being cheated out of her elimination plan. To be sure, it means work on the part of the victim chosen for slaughter,—a higher degree of skill than the degree required by other folks,—but just look at the compensation!

An individual marked for elimination has commonly so much higher than average intelligence that it is within his power to outwit nature by adopting hygienic methods for

himself. He may conform to a system of eugenics in order to save the family name, and send it along through a wholesome number of generations. We are not to overlook the point of high average degree of intelligence among those with stigmata of decadence. There are the feeble-minded and the defective past hope, to be sure, requiring our consideration and care. At the same time, the genius and the exceptionally talented raise the total average of intelligence, even though they possess common physical defects which we read with a meaning. It is true that all these people with high-arched palates, defective ears and narrow costal angles, and with corresponding defects in ductless glands, are especially prone to develop tuberculosis, worklessness, cancer, insanity and high cost of living. Yet these people may use their gifts of bright minds as the boy uses his gift of fine tools, for carving their way out of heredity, and transforming Ibsen into a scarecrow with his dependence upon laws of heredity. Ibsen, by the way, has material enough for two scarecrows, one wearing dresses.

Take the example of one of the greatest men of our time or of all times. He was born with neurotic tendency, and if nature had not given him a square jaw he would have become a neurasthenic about the time of reaching voting age. His bright mind cut itself past limiting walls of heredity. He developed a fine physique, and then we had the great value of a citizen with double rose mind and with root and branch of an oak. We have another example in a great ruler born with physical defects belonging among the penalties of high civilization, but with the fortunate accident of a square jaw. He has so conducted his hygiene that he possesses tremendous power physically as well as mentally. Under less careful physical training he would have become a neurasthenic with vagaries of weak-willed ruling. It was only an accident that he was born with a square jaw, otherwise he would have been

heard of only as a patron of realistic literature or of morbid music and art.

The pedagogy of the monistic unity state will not depend upon the accident of a square jaw for helping a man to carve himself past walls of heredity and to develop genius. It will teach all individuals how to use their talent for building locomotives that are capable of carrying their bright headlights.

Many geniuses approaching death have felt that their lives were wasted and they had failed to express what they yearned to express, under the urgent impulse of genius, whipped up by the microbe. It was because they went fast and far in wrong paths under this whipping. A proper pedagogy would have conserved their powers and would have directed them aright. Civilized nations are just beginning to turn over in their sleep on this subject, but they are not yet awake. There comes to mind an occasion about thirty years ago when my friend Dr. Phelps and I found ourselves in a certain country where tuberculosis of the joints was treated in a desultory way, with faithful but cheerless endeavor on the part of surgeons. "Why is it, Phelps," I asked, "that these ultra-scientific people do not treat their cases of joint tuberculosis successfully, as we do at home?" He replied, characteristically: "Oh, Lord! They are too scientific. They make a diagnosis of tuberculosis, and then faint away and tumble over into it." That was the whole thing in a nutshell. We have been doing the same thing with hereditary tendency to disease, and the nation that first awakens to the fact will lead in all things, as America led in treatment of tuberculous joint disease thirty years ago. Our surgeons at that time said it could not be tuberculosis because the patient got well. The foreign scientists said the patient could not get well because it was tuberculosis. Both object lessons were going on at the same time in the early eighties.

Is it better to leave children a great fortune and small degree of health, or to leave them a great degree of health and small fortune? Take out that notebook, write down the names of a dozen of the first people who come to mind, and the question will answer itself. Do not assume that the question means a necessary alternative, for there are plenty of people who leave their children neither health nor fortune, plenty who leave them both, plenty who will split the difference. My point is made for the purpose of helping the flanks to an appreciation of the middle position. If a man loses meals, sleep, or necessary exercise because of trying to gain an unhealthy fortune, the children must pay the penalty heavily, even though parents themselves may not pay it so heavily. Nature may allow a well-conducted family to taper down to mean type after the development of a genius, and the conducting of such a family will be done systematically later, by the pedagogy of a higher civilization.

There is always a tendency for men to throw themselves into all of the work in sight, regardless of health. The result is a more or less morbid product of the mind when physical strength is exceeded.

The expression that a man is burning his candle at both ends relates to a neurotic vanity of labor. When a man puts aside judgment in order to satisfy the craving of a vanity to work beyond his strength, we commonly find him boasting about it, or at least assuming a pleased look when the subject is mentioned. Any amount of labor for which a man is healthfully capable and competent is theoretically desirable. Beyond that point he is working at a loss. The amount of work which a given man can do while burning the candle at one end comfortably would burn another man's candle all at once with a flash. It is a relative matter, and the burning of a candle at both ends relates to vanity of which men boast.

This vanity, however, is frequently morbid in its nature, and means abnormal irritation of protoplasm from microbic toxins. The neurasthenic who is highly irritated may be restlessly and unceasingly at work which should not be done at all.

All of the great questions in which men are interested will be forgotten for the most part in a few years anyway, and men are simply passing incidents. Consequently, it is important for us first to reserve physical strength, and not try to reach the horizon of every vista when we find it costing too much.

If a man writes until the small hours in the morning, puts the manuscript aside, has a good sleep on the following night, and after that reads his manuscript again, the chances are he will not publish it in the 2 A. M. form. It will not ring true even to his own ears after he has had a good night's rest.

If one writes a controversial or a fighting letter late at night, puts it away in a drawer and keeps it for a couple of days, he will seldom send that letter if he reads it over again.

A man who is writing and thinking at night is employing a good deal of waste cell material in his work, mixed with his good material. He is responding to irritating products of toxins of many kinds which ordinarily have a function in putting him to sleep so they may be eliminated methodically while new cells are regaining energy.

When speaking of the influence of the mind upon various structures, we may classify all physical influences as belonging to the action of the brain and nervous system. The relative proportion of energy granules in a nerve-cell will determine the degree of efficiency of that nerve-cell, influencing all of the other tissue cells of the body, because they lie in a circuit of and under the influence of the nerve-cells. Neuricity employed by nerves for the purpose of transmitting impulses is a form of energy very much like electricity as employed in

telegraphy, and energy granules of the neuron are used up when the nerves are engaged in work, very much as the elements required for developing electricity in telegraphy are used up, and need to be replenished. A telegraph operator, utilizing his own neuricity in the occupation of keeping the electricity of his employer going profitably, knows how much depends upon obtaining a regular and orderly supply of electricity. He does not so often stop to think how much greater need there is for care in obtaining a regular supply of neuricity for himself. The reason why nightwork is the most wasteful and the least profitable is because energy granules of nerve-cells are pretty well used up as night approaches. The time of their renewal is naturally during the time of sleep at night. Even in the case of such an imperturbable organism as an European sparrow it is found, in laboratory experiments, that the granular protoplasm of its brain cells is less in amount in the evening than in the morning. The morning allotment gradually deteriorates during the day under normal conditions, and is exhausted very rapidly if the sparrow is subjected to the influence of a degree of fright which would correspond to the financial troubles of a higher organism. There is nothing metaphysical about this running of granular protoplasm out of the brain cells of a frightened sparrow. It is just as matter-of-fact a mechanistic process as the rolling of peas out of a paper bag that is being shaken. In man as in other animals, neuricity is usually discharged slowly, unless some emotion pours the peas out of the bag rapidly.

In the monistic unity state the study of man will comprehend him as a city of organic cells. Each organic cell will be considered from the standpoint of its mass of molecules. Each molecule will be thought of as a mass of atoms. Each atom will be described in its physical and chemical relationships in terms of positive and negative electrons, beginning from the

first appearance of these in the ether. Neuricity will be studied in terms of electrons or of magnetones. When this is done the phenomena of heredity, memory and intelligence, and our ideas of politics, religion and morality, will all be explainable from basic knowledge relating to positive and negative electrons and the ether. These notes of mine give a fairly long take-off when describing human characteristics as depending upon the results of warfare between organic cell and microbe, but the monistic unity writer will be more daring in his choice of a point from which to leap. He will begin from the electron.

The recent observation that nerve fibres persist longer than other soft tissues, like telephone wires in a burned building, is in line with the observation which I made and recorded in 1905 in relation to the persistence of these telegraph wires in the appendix which was undergoing fibroid degeneration. The observation was reported in explanation for the phenomenon of nerve centre disturbance caused by fibroid degeneration of the appendix, and which was out of proportion to the gross significance of that lesion. The contracting fibroid tissues entrapped nerve filaments and this led to a series of secondary digestive disturbance which my confrères were slow to believe could depend upon a lesion which appeared to be insignificant.

It is improbable that neuricity is convertible into electricity, or *vice versa*, unless we consider the matter in a large way, which includes the idea that some of the electricity which is turned loose in the body (a conductor) may reappear in the form of neuricity. Neuricity, which is expended in giving nerve impulse, is expended within the body, and part of this may be convertible into other forms of electricity, on the ground of the monistic unity idea that all energies and all matter and the ether may be convertible one into the other. Neuricity is much like electricity, excepting that it acts more

slowly (see note on the subject of consciousness), but different kinds of electricity have different rates of progression. So far as we can actually know at present, neuricity merely supplies power for a nerve impulse like that which stimulates the electroplax of a torpedo fish into generating and discharging electricity. The electroplax of a torpedo fish is mostly made up of modified muscle and of connective tissue, arranged in alternating plates, each set with its respective degree of osmosis. (The activity of the electric organ of a fish can be brought about by artificial means experimentally according to Dahlgren.) Electric action generated through the influence of modified muscle varies only in degree from that of ordinary muscle action, in which there is always a small amount of electricity which comes as the result of chemical changes in the tissues. In the electric organ of the torpedo fish this process seems to be highly specialized. The same sort of galvanic action is caused by the passing of a nervous impulse over a nerve, but in both nerve and muscle the electric action is held to result from activity, instead of being a cause of it. The generation of carbon dioxid as the result of nervous action has been definitely established. This means that nervous activity has as its basis a transformation of energy involving oxidation. A portion of this energy manifests itself electrically. Oxidation of nerve-cell protoplasm includes a transformation of energy, a part of this energy manifesting itself electrically. When a nervous impulse, or some other stimulant, excites response in muscle, it merely upsets the balance of force in the resting cell and causes those specific changes for which the tissue is specialized. The electric current is held to be merely a by-product of chemical changes, as a rule, but in the electric organ of a torpedo fish it becomes the specific action of the tissue. Further, on general grounds, we cannot say that neuricity is transformed directly into electricity in the fish, because a

small amount of energy (neuricity—electricity+?) cannot be transformed into a large amount of energy. Blood takes nitrogenous materials to the electroplax of the torpedo fish, and these materials there undergo a metabolism which prepares them to disintegrate through catabolism and produce energy in the form of electricity. The electric discharge in the torpedo fish is under control of voluntary brain centres; the motor centre is a development of muscle-motor cells in the anterior horn of the medulla. If these muscle-motor cells discharge their neuricity into the special organ of the torpedo fish, stimulating it into discharging a large amount of electricity, a speculative hypothesis might include the idea that some of this neuricity energy and some of the electricity energy, which are liberated as the result of chemical change in the cells, exchange function continuously. Both neuricity and electricity probably have origin in the alkaline and acid reactions taking place during destructive changes in body cells in the course of ordinary metabolism and catabolism.

Raphael Dubois has shown that the phosphorescent light of various insects and still lower forms of life is a product of zymosis. Luciferase and luciferin when mingled together give out this light when water is brought into contact with them.

Crile states that the brain-cells of a torpedo fish show exhaustion immediately after the discharge of electricity from the electroplax, indicating a great effort on the part of the fish. This report, if confirmed, is extremely interesting as showing that the discharge of neuricity granules from the brain-cells corresponds in degree to the discharge of electricity from the decomposition of nitrogenous materials brought by the blood to the vicinity of the electroplax. Nitrogen gives us the most powerful explosives among the inorganic combinations which are used in warfare, but a very small cap

will suffice for detonating the large discharge of an inorganic nitrogenous compound. In the electric fishes there seems to be a need for a large cap for exploding nitrogenous organic compounds. With inorganic explosive compounds, the cap is inert until excited by physical force sufficient to cause fulmination, but in the fish the "cap" is practically inert only in one sense until "fulminated" by the direction of physical force derived from the energy of nerve cells. In the fish the materials which compose the "cap" at the same time furnish exploding force for the "cap." There is a curious relationship between the explosion which takes place in the fish and the explosion which takes place in a bomb, excepting that in the fish, energy liberated from nitrogenous compounds is manifestly in the form of electricity, and in the bomb in the form of expanding gases. Nitrogen is apparently the element which furnishes the energy for both kinds of demonstration.

It is an interesting question if the discharge of electricity from a torpedo fish is an exaggerated manifestation of "consciousness," and if we may trace the more ordinary consciousness of an individual backward from such a violent objective example.

The balanced discharge of energy associated with muscle action, the unbalanced discharge of energy in an attack of epilepsy, or any other discharge of energy, represents manifestation of some phase of consciousness. The response which is associated with the discharge of energy from a torpedo fish is chosen for purposes of discussion for the reason that it serves well for a nucleus about which we may group collateral facts for purposes of argument in relation to the behaviour of organisms. The electrical properties of tissue like that of muscle indicate the existence permanently in the resting cell of a difference of potential between the outer and inner surfaces of its plasma membrane. This membrane may become

the seat of a potential difference by interfering unequally with the diffusion of the anions and cations of an electrolyte contained within the cell. A living tissue of any sort, nerve as well as muscle, in its relation to an electric current is an electrolytic conductor, subdivided at intervals by semi-permeable partitions, the cell membranes. A flowing current of electricity (perhaps also of neuricity) carries anions toward the anode and cations toward the cathode, but at the cell membrane this movement is blocked. A concentration of anions thus tends to rise above that of cations on the side of the membrane facing the cathode and *vice versa*. When these changes of concentration reach a certain degree we may assume that stimulation of the cell is a result, and this, let us say, gives the ordinary consciousness of being (cenesthesia) which is reported to the nerve centres by neuricity energy. Nociceptor and beneceptor nerves are developed in higher organisms by appetency we may suppose, in response to the relative degree of need for elaborate report. If we may assume that stimulation of a cell is the expression of a change of electrical polarization, due to a change in the concentration of ions at the cell membranes, we may then ask if different kinds of polarization effects are not due to the relative time and character of any given flow of electricity (or of neuricity) caused by liberation of potential energy in response to different external agencies like those of light, heat and sound—perhaps also in response to exercise of the will by an individual. Should that be the case the subject of consciousness is removed from the field of philosophy and placed in a physical category.

We know that the electroplax of a torpedo fish is made up of modified muscle. The cells of this modified muscle may carry a special sort of plasma membrane not differing greatly from that of the common muscle cell but sufficiently different to conduct the liberation of energy from nitrogenous material

in the form of an electrical charge. Let us assume that the degree of electricity requisite for causing and reporting consciousness of the ordinary muscle cell is increased in the tissues of the electroplax of a torpedo fish for a special purpose—a weapon purpose.

We have been taught that evolution of electricity is a by-product of cell action of the tissues, and not an entity essential to the life of an individual. The electron theory of matter, however, might allow us to look upon this question in a new way. Electrical changes, we may suppose, are taking place momentarily in the course of alternate charging of satellite ions of the atoms of a colloid molecule which is engaged in exerting ferment action. (Life process. The mere fact of cohesion of colloid molecules of a cell indicates that chemical affinity is acting over molecular distances in such a way that attraction predominates over repulsion between groups of alternately charged molecules.) Electricity in excess of the amount required for the work of a cell may give us that negligible quantity of electricity which has been noted as a result of tissue action and classified as a by-product (which it would be under these circumstances). This by-product amount of electricity is instantly dissipated without notable result when leaving the ordinary muscle cells, but is fired in large quantity from the electroplax of the fish.

Anions and cations seek each other with energy and cease to be electricity when they come together. Energy being expended in their effort to get together, can it be possible that anions and cations exist together on both sides of a protoplasmic cell membrane which is a conductor? Nernst, I think it was, showed that when the uninjured outer surface of a muscle was connected through a galvanometer with the exposed interior the elements (cut surface) a demarcation current flowed from exterior to interior, indicating that the

outer surface of the cells has a higher potential than the interior. This potential difference appears to be dependent upon the semi-permeability of the plasma membrane of cells. It is absent in dead cells which have lost that character of semi-permeability belonging to living plasma membrane. If the plasma membrane allows cations to pass outward freely but prevents the free passage of anions, a condition would result which we seem to observe in relation to living cells. The plasma membrane appears to be the seat of the most characteristic demonstration of stimulation,—the electrical variation current. Electricity as produced in the body is under low voltage;—lower voltage than we ever deal with in the laboratory or in commercial uses of the current. Under these conditions the cell wall if giving but moderate insulation may resist sufficiently to hold back the anions from the cations. According to studies of Osterhout with the chemical dynamics of living protoplasm, it is shown that electrical conductivity of protoplasm varies according to the degree of viscosity of protoplasm. The viscosity of plasma membrane differing from the viscosity of the protoplasm of the interior of a cell, results in the existence of different degrees of conductivity between plasma cell membrane and the protoplasm surrounded by that membrane. This state of matter would seem to furnish conditions which might result in stimulation of protoplasm to the point of its sending an impulse by way of neuricity.

The question if neuricity is electricity could not well arise from our former conception of electricity, but the electron theory allows us to ask if the idea of a colloid phase of electricity may not be thinkable. By that I mean a flow which is infinitely slower than the flow of class-room electricity—following the same general laws, but adapted to the needs of organic life. Vibrations of light, heat, sound, and exercise of the will, produce nervous impulses independently of elec-

trical conditions as we understand class-room electricity; yet, class-room electricity may be made to produce nervous impulses allied to those which occur in response to vibrations of light, heat, sound and the exercise of the will. For that reason I like to think of neuricity speculatively as a colloid phase of electricity which may arrange its own anions and cations upon both sides of the plasma membrane of an organic cell. In that case as a result of stimulation of the cell membrane we may imagine that the phenomena of consciousness would appear. Neuricity may have still lower voltage than that of low voltage body electricity, and yet come under the classification of electrical matter.

Our present conception of electricity must be based upon the electron theory that electricity is matter in the form of electrons, but the anions and cations are different phases of matter having strong affinities for each other. When the atom of hydrogen was resolved by J. J. Thomson into approximately eight hundred electrons Sir Oliver Lodge said that "the electrons were the things of which matter is made." Hence matter, infinitely divided, might appear in the form of neuricity electrons. Neuricity is at least suggestive of matter in motion. Infinitely divided matter gives us the cathode ray. An organic cell stimulated by electric energy, when its plasma membrane undergoes changes in degree of permeability under the influence of varying osmotic pressures, might send forth infinitely divided matter in the motion of neuricity (with consciousness perhaps as its X-ray). The formation of plasma membrane about the periphery of a cell may perhaps be due to a special arrangement of molecules in response to some such applied force as that of osmosis energy. Osmosis, according to Le Blanc, may be considered to result from the different internal pressures of solution and solvent, the internal pressure being the resultant of the normal components of the

unbalanced molecular attractions at the free surface of a fluid. Plasma membrane may be formed at the peripheral contact surface of a cell for the purpose of preventing the chromosome from losing its integrity and going wholly into solution in the presence of solvent colloid or crystalloid solutions. When such a protective cell membrane has been formed, it apparently proceeds to serve a purpose one step higher, through the semi-permeability of its structure. This higher purpose includes perhaps the conducting of an electrical seance in such a way that the chromosome becomes "stimulated." Stimulation may perhaps result in strain leading to fission or mitosis of a cell, aside from making neuricity report to the higher ganglionic nerve centres of an organism. Lesser centres not yet described may receive neuricity report from new cells which are forming *in vitro* when Carrel grows tissues in artificial media.

Loeb applies hypertonic salt solution to the egg of a sea urchin. Plasma membrane of the cell then becomes the seat of an exosmosis which I assume changes the character of the electrical variation current, and the protoplasm of the cell is stimulated into performance of the act of mitosis. We call that the beginning of growth. The neuricity report which perhaps occurs as the next step in concatenation may be what we term consciousness,—a function that is exercised by all living organisms.

Let us look at the matter from a corollary perspective. The word "awareness" comprehends about all of the different synonyms and definitions for consciousness. Awareness may perhaps bear the relation to neuricity that the X-ray bears to the cathode ray impulse. If neuricity is like electricity in consisting of matter, both are alike fundamentally. The discharge of electricity by a torpedo fish would then represent the ultimate effects of a discharge of neuricity—a discharge

of consciousness. While awareness relates primarily to the individual organism, its manifestation may be expressed in such a way as to include other organisms in its range of influence. An acorn enters into a state of awareness of the energy of light, and makes expression of that awareness through multiplication of its germ cells. It then enters into competition with other plant organisms. The acorn, moreover, possesses mobility. It extends a sprout over an inch of obstructing stone and having found soft ground proceeds to draw itself up erect according to the laws of symmetry. The difference between the consciousness and mobility of an acorn and the same phenomena manifested in man is merely a matter of degree. The Venus-fly-trap enters into a state of awareness of the alighting of a fly upon its cilia, and it proceeds to get the fly into its own digestive apparatus. In his studies with sensitive plants (mimosæ) Bose uses the terms for describing plant phenomena that are familiar to us in our work in animal physiology. He states that there is hardly any phenomenon of irritability observed in the animal which is not also found in the plant. A man enters into a state of awareness of the presence of food, and makes expression of that awareness through acts of mobility belonging to an appropriate emotion,—his emotion representing a special phase of awareness. A torpedo fish enters into a state of awareness of the presence of an enemy, and makes expression of the degree of awareness through the firing of a charge of electricity by means of an inciting charge of neuricity.

The slowness of the current of neuricity along a nerve as compared with a class-room electric current along a wire is apparently due to the fact that nerve fibres are somewhat like cable wires, consisting of a layer of insulating fat about a protoplasmic conducting core which is not fat, and which theoretically corresponds to normal salt solution as an elec-

trical conductor. This gives us a conductor with distributed capacity which charges up one condenser after another as shown by Williams and Crehore in their experiments with electrical measurements in the phrenic nerves of cats. They were enabled to construct an artificial phrenic nerve out of glass, paper, tinfoil and graphite, the total resistance and capacity of which were of the same order of magnitude as those of a cat's nerve. One may conceive of the possibility of the wave lengths of neuricity becoming accelerated into wave lengths of electricity.

For purposes of argument we may assume that something similar happens with neuricity when an author discharges energy in the form of a masterpiece. Neuricity is discharged rather more slowly in the masterpiece which produces an effect, than is the electricity of a torpedo fish, which produces an instantaneous effect. No matter whether neuricity serves as stimulating agent, or as part of the energy manifested in electricity, the source of neuricity and the source of electricity require proper, regular and constant renewal, or exhaustion of the entire machinery will follow. The machinery of the whole body is required in man for making his neuricity and in the fish for making its electricity.

According to our system of social custom, the time of quiet is at night, and most brain workers are inclined to work continuously at that time because of the quiet. If the same amount of intellect that is employed in the night hours were employed in the early morning hours, our progress would be more rapid, because of the better store of neuricity granules in morning nerve cells. It so happened that one year I was reading Kant's treatise on "Pure Reason" and Young's "Night Thoughts" at the same time. On account of my other work, it was more convenient to read Young's "Night Thoughts" in a fragmentary way in the morning, and Kant when there was

time for concentration in the evening, but I found shortly that I could not read Kant successfully in the evening. On changing the order of reading of the two books round about, both appeared in an absolutely new light.

A man worries and tosses about after retiring at night and cannot sleep. Toward morning he manages to get some rest. He is not awakened in the morning by those same worries. Why not? Because his neuricity granules are replenished, and he is ready to take charge of any question. The more sleep he has had the better his equipment. Therefore worrying after retiring at night is not practical, aside from the physiologic unwisdom of the phenomenon.

When a man makes it a custom to retire at midnight and does not arise until eight the following day he loses that fine inspiration in living which makes the robins all burst forth into song at daybreak. The world loses something of the inherent value of each and every man who chooses these hours for stocking up with neuricity granules. We shall have more and more late retiring and late arising, also later dinners,—all these being in line with the incline of the plane in civilization after certain cultural limitations have been approached. People who adopt these habits will ask why we are on earth, and no one of their confreres will be able to give a very satisfactory answer.

The psychic physicians tell us that happy people are usually healthy, but they forget to tell us that the converse is equally true.

In olden times, in the early days of England, the alcoholic debauch was extremely common, even among cultivated people. At the present day we have ambition debauch similarly. There is little consideration for health or for progeny, so long as one is engaged in ambition debauchery.

When a man is struggling for fame and fortune he is a mere puppet that is being worked on a string by nature. She is trying to induce him to run himself up to his protoplasmic limit in order to make exhibition and then end his lineage, making room for others. Nature is as cruel as a boy who has tied a string to the leg of a mouse when she chuckles at the antics of a man who is proud in the thought that he is free. He is tied to an evolution string which men call "grand ambition." Man with his higher intelligence is never lacking for words with which to place natural phenomena to the credit of his egotism. That is one of nature's little jokes. It is one of her ways for making him contented and to keep him from worrying about the string which she has tied to his leg. We are not to have less ambition. It is a duty on the part of man to develop the greatest of ambitions and to follow them to their logical conclusions. The only point I would make is that we are to do it understandingly, to laugh at nature's little joke, and to do the best we can, knowing the terms. No one but the weakling can escape. Nature tires of trying to play with a weakling, pulls the string off from his leg, and tosses him into the bonfire at an early date.

The result of ambition debauchery is not always shown in the individual himself. In fact, two stages of intoxication may appear, first in the father as strenuous exertion, and in the son as indolence, corresponding to the elative stage of alcohol followed by the depressive stage. Strenuousness and indolence represent the first and last phenomena of any sort of intoxication.

Dyspepsia develops along with greatness in the individual very often, but is apt to be more marked in his child. Some men can do a tremendous amount of work without injury. It is the ambitious ones who cannot do this amount of work without injury, and who lose meals and sleep, who injure

their families. Just as the logical end of culture is elimination of the race, so the final refinement of gold is dross. It is the mean position between the two extremes which carries the greatest value in culture or in gold.

In refinement of man and of gold, there is progressive loss of physical substance, but the point at which we get the largest proportion of pure man and of pure gold represents best value.

Try to refine gold to a finish and one continues to get dross, and in the end has no gold left,—dross only. So in refinement of man the end-result is dross. An unclean refinement is often noted in the decadent. He is nearing the point where no gold remains—dross only.

In continuing the refinement of gold down to the point where nothing is left but dross, the gold has not disappeared as matter but only as gold, and it now exists in other forms.

It is probable that the mean type of man in the next century will be free from the degree of fatigue which is so common to the present day. Just now ambition, dealing with examples of strenuousness for its ideals, leads men beyond their physical strength before they have come to understand that physical strength must be developed in proper proportion for obtaining best mental action. Men have heard these words used, but meaning nothing concrete to them. The words are used like a religious formula and not applied.

When cultural limitations are being approached, many individuals with lessened or lost breeding instinct find the whole sexual question repellent or even disgusting. For them there is no natural joy in any phase of the subject. Frequently of that high intellectual development which goes with decline, they are enabled to impose hardships upon exemplars through arbitrary influence upon laws and social customs. When cultural limitations are being approached many individuals who have lost keen desire for an abundance of food find the

question of eating repellent or disgusting. Religious ascetics of this class, sometimes highly intellectual, have been enabled to impose hardships upon exemplars through the introduction of fasting into social and religious customs. When cultural limitations are being approached many individuals who have lost the desire for economic comfort find the idea of worldly blessings repellent or disgusting. Highly intellectual, they have been enabled to impose hardships upon exemplars through their propaganda against the creation of capital.

With these three kinds of people we find the three primal needs playing a part which is secondary to a peculiar conception of human conduct, that is based upon abnormal personal experience. The study of human conduct must always take these really extraneous influences into its problems and estimate them at their fact value. Human conduct is not different from bear conduct or from ant conduct, excepting in its complex elaboration of procedures, all of which have a meaning which may be carried by the science of comparative conditology back to the simpler conduct methods of the bear and of the ant.

In the monistic unity state there will be a "department for the study of comparative decadence" at every university. There will be a dean and professors of special fields of decadence relating to the organic world. It will be one of the departments of the university presenting voluminous reports.

With bad-effect object lessons plainly in view, educators still allow children to read about men who went without their meals, or without sufficient sleep in order to accomplish their tasks. Teachers allow children to carry an idea of the desirability of such concentration without adding any description of the character of injury which results.

Thousands of kind and wise mothers and devoted and true

fathers have viewed with alarm the defective health of their frail children, and have asked, "What have we done that we or our children must suffer so much?" The answer will be clear and well defined in the monistic unity state. An answer given in deepest sympathy will be: "Actuated by ambition, laudable and noble, you worked and worried to the point of losing part of the normal control over the sympathetic ganglia controlling metabolism. Microbes gained headway, your germ plasm and soma plasm were over-sensitized and injured, and all cell construction entering into the make-up of your little children shows the payment of the penalty." Just as sacrifices upon the altar were made in olden times, in the same way children of the great have been dying upon the altar of their parent's ambition. In the monistic unity state this sign of our times will be read clearly, and will be explained by historians of the future, who will call attention to the curious fact that we could not see the sign in our own day and time. This sacrifice of children of the great and of the genius is cruel, pitiful, but it is only by cruel and pitiful lessons like that of Christ upon the cross, and the child of over-sensitized parents upon the altar, that man's attention can be turned to the subject for proper guidance.

We often see children thrown upon the world with long faces and wrong views of life, because their parents were allergic to microbe toxins. The respective aggregations of sensitized protoplasm of the two parents had vibrated inharmoniously in response to external impulses. Consequently there was little agreement between the parents. Disagreement represented physical condition but was not recognized as such. It would be almost a joke if it were not so sad, that the great generals of great nations, great philosophers and writers, have so often been unhappily married. The reason often

enough was because they and their wives were originally attracted to each other by recognition in each other of fine intellectual qualities, without realizing at the same time that such development often went with defective ductless glands as a penalty of high civilization. With loss of efficiency of the ductless glands, different individuals' protoplasm would vibrate so differently that harmony would be out of the question and beyond the efforts of the will. Two high class pianos of similar character and from the same maker always have a somewhat different tone, and if tuned by different tuners, the qualities of tone might not blend well. Two intelligent people of the very highest quality may be tuned differently by different microbes.

Talent and genius do not necessarily offer valuable assets for marriage contracts, in fact may be very undesirable in that field. The individual may be impelled to follow his or her inspiration bent, with disregard of other things. If the talent and genius of the one awakens full and genuine response in the other, well and good; but marriage because of talent as a chief asset in one, may be as disastrous as marriage because of a million dollars as chief asset in another.

Geniuses are not as a rule desirable for husbands or wives. They often attract others who wish to become moons, receiving light from a sun. One of my acquaintances who is rapidly becoming famous because of his genius in a certain field, was very much admired by a certain young woman, and their engagement was announced. She found that he was devoting a great deal of time to his subject and not very much to her, and the engagement was broken. What this young woman really wanted was to share the glory of a man who is attracting so much public attention, but she was unwilling to take any part in the deprivation or self-sacrifice which he had to make—part of this self-sacrifice being demonstrated in his

lack of attention to her. Attention to her was something that he no doubt would have enjoyed very much more than sitting up nights working over intricate problems. The genius in literature, art, science, business,—man or woman,—is apt to be so wholly devoted to development of ideals that little time is left for the pretty daily amenities of life which are insisted upon by that lesser mind which does not appreciate the compelling exigencies brought about by great and powerful ideals —which may interfere with affection.

There is always danger in developing demonstrative affection, because it becomes so attractive that one may be turned from great undertakings in order to enjoy love. Many a genius has been kept from giving his power and light to the world because there was so much demonstrative love near at hand. If the genius happens to be a literary character and if two Brownings by chance get into the same home, nothing is lost, but otherwise there is waste of sublime power in the selfish enjoyment of the love of "a few."

The value of women is estimated by uncultivated people in an instinctively primal way, according to the comparative density of population. At Port Said, for example, girls a dozen years of age are offered for sale by their mothers at prices ranging from five pounds to ten pounds sterling each, the purchaser to do what he pleases with them. Still further East the prices are lower yet. On the other hand, among the American Indians who never made dense population, the girl child was held in a reverence second only to reverence for The Great Mystery.

A fundamental reason for the tendency toward late marriage exists. As people become aggregated in the cities in response to the gregarious habit belonging to *Homo sapiens,* there is instinctive tendency to stop breeding. Breeding

instinct cannot properly be separated from sex instinct, and the two terms must be used synonymously, excepting where one arbitrarily makes a distinction for a special purpose. A distinction is arbitrarily made for a special purpose in these notes. We have to separate the idea of normal sex instinct from its natural place alongside of breeding instinct, when the decadent stage has arrived. Under conditions of decline as in the weak-minded and many others of the decadent group, sex instinct may become exaggerated or abnormal, taking a variant superficial form which retains little connection with the breeding instinct. The superficial variant form of sex instinct may present abnormal phases like the mutations occurring in the material part of organic structures. For that matter the character of any instinct is dependent upon the condition of physical cells, and must vary with varying character of such cells.

Sociologists will continue to call attention to the fact that breeding is carried on mostly by people of the mean type, rather than by the most highly cultivated. They will continue to urge the most highly cultivated people to marry more frequently and to bear more children. They will not realize that by so doing they are throwing a stone directly into the face of nature. The only way in which nature can be persuaded to change her present plan and to remain good-natured in the presence of misconception of her motives will depend upon method which leads to better chemical processes. In other words, to social method which secures extensive oxidation of toxins.

This instinctive tendency to stop breeding is observed in flocks of quail when the limit of food supply in any locality is approached, and we see it when bass and carp are confined in small ponds with short food supply. Nature sets limitations upon the development of any species in order to preserve

the balance of nature, and this is expressed in different nations of *Homo sapiens* in their tendency to allow the birth-rate to diminish. Nations which are marked for long survival breed individuals for survival, to the extent determined by the food supply, but more particularly in accordance with limitations which are set upon development of the protoplasm of that particular flock of people.

When quoting the tendency of quail to stop breeding when the limit of food supply is being approached, one of my friends opposed the idea that birds can have any such instinctive knowledge. He thinks they simply fall off in breeding when the limit of food supply has been passed, because they are not well nourished enough. Now, as a matter of fact, I have shot very plump quail in localities where the flocks had a tendency to remain together and not break up in the spring time, because the local food limit had been approached. He also thinks there is no instinctive tendency on the part of *Homo sapiens* to stop breeding in congested districts, but on the contrary, to breed more rapidly. I am glad he brought out that point because it proves the necessity for emphasizing the fact that the time comes when we have to understand the difference between sex instinct and breeding instinct in the course of decadence. They are synonymous terms under normal conditions, but the time comes when we have to make a distinction, and in the course of decline of a family or of a race, sex instinct may be abnormally developed, as we see in the feeble-minded individual. The breeding instinct, which includes primarily a desire for children, is at the same time low or in abeyance. The breeding instinct has a deeper origin than sex instinct. We prove that by the fact that it dates back to the simple division of a single celled amœba, and to the division of cells in other low forms of life in which both sexes are associated in the same individual. Sex instinct is a

feature of higher development in animal life. Long after nature's limit for the breeding of a species has been approached, sex instinct may continue to be developed as a variant instinct far out of proportion to the normal, while breeding instinct at the same time is declining.

Protoplasm is the essential unit in cell construction and each species of plant or animal is allowed a certain range of employment of this protoplasm. Any given species may fail to reach the limit of employment of its allotment of protoplasm, if lack of intelligence allows destructive agencies or tendencies to dominate. Late marriage is one of the destructive tendencies. Late marriage in the life of the educated is more serious for the race than late marriage in the laboring class, because it is the educated man upon whom we depend for progress. Intellectual occupation, however, requires so much time for preparation of a man to the point where he can either feed himself or bury himself without financial assistance,—to say nothing of marriage,—that under present conditions late marriage is almost inevitable. In the chosen state, parents of children, and the state itself, realizing the economic importance to the state of early marriage, will make some sort of provision favoring early marriage of its educated men. Many a father has wisely allowed his son to struggle for position in the world, but has been unwise in not promptly furnishing means for that son's early marriage when he observed the signs of that instinct. If a man does not become a father until a time in life when he cannot train his boy in full sympathy and understanding, both sides lose something. Further, it is very important for a man to become a father at a time in life when he is most vigorous and can impart this vigor to his offspring. If a man waits until he has made a secure position in the world, commonly under conditions calling for strenuous activity, he is not the sort of material that

would be chosen on the stock farm for making that particular farm famous. We must not sneer at that part of the stock farm plan which relates to the age of parents. The matter of expense of bringing up children is relative after all. If a man or woman has been brought up to a manner of living requiring large financial expenditure, it is indeed best for the young people to get back to the pleasure of simple life. One may have almost anything he wants in this world if he does not want too much. There is some difficulty in arranging for early marriages because of financial barriers, and this is due to our present methods of pedagogy. In early life we are taught the esthetic side of life. That is one half of what is wanted in married life. Then we are trained in the economic side. That is the other half that is wanted. The esthetic and economic sides are charged differently, as the physicist would say, and when made to approach each other at the present time there is repulsion between the two sides. This state persists unless the will is brought to bear and the two sides forcibly brought together until they remain in equilibrium,—as they should have been in the first place under proper methods of teaching. It is one of the privileges of culture and of education to know how to adjust these two sides for best efficiency at the present time, so that two people can understand why they are marriageable. This is not done often as yet because of economic difficulties.

The economic motive is sometimes equally strong with the esthetic motive in leading to marriage. My German barber had been a bachelor until well along in life. He recently married. I asked him if he enjoyed married life better than single existence. He replied, "Ah, yes. I told Rosie yesterday dot a leetle piece of bread at home tastes better now wie cake used to. I said to her, 'Rosie, if you vos to die to-morrow I vould haff anodder vife in two veeks. I vould never be

a bachelor once more.'" Perhaps when my barber has been married for a long enough time a calamity in the family may change his point of view from the economic to the spiritual. He may bend beneath the noblest of obsessions and live alone in the memory of a loved one departed. Neither economic satisfaction nor spiritual obsession is fully commendable, however, because our highest function is best exercised in utility, and utility is best conducted by sharing our lives freely with others, not in exaltation over personal gratification nor in solitary depression over personal grief.

Our premises assume that people really want to marry. Sometimes they do not. That brings in another question altogether,—the question relating to race decadence. Two normal individuals can play merry tricks with nature over her carelessness in charging the esthetic and economic sides differently if they have the will to do so,—for the separate charging is simply an accident belonging to our present day educational methods. It has no relation, however, to one question, that of structural defects belonging to cell injury in the decadent group. There is far greater adaptability among young people than among older ones. Each one makes adjustment in the world according to personal experiences. Feminine and masculine experiences are different in their nature. Consequently, a man or a woman successful in adaptation to surroundings for their respective purposes, have been removed farther apart all the while. It is during the very plastic stage that two people best learn to adapt themselves to each other.

The argument has been made that geniuses are mostly the younger children in families, who have arrived at a time when the parents were well along in years. Instead of being an argument in favor of late marriage, this classifies the younger child who is a genius as a double rose, for the very reason that the parents were advanced in years. If the most gifted

people are shown by statistics to have come from the later years of married life of parents, we need immediately another set of statistics, showing how many, and how gifted, are the children of these gifted ones. Right there is where the fallacy occurs in the argument of trying to prove the desirability of a late-coming child. These notes at many points show that he is not the most desirable citizen so far as race propagation is concerned, although he may be of supreme value to the state for the moment.

We are told that the reason for the decreasing birth-rate in France is due to the peculiar marriage laws in that country, and to the custom of the dot. But this is not really the fundamental reason. It is used largely as material by theorists and misinformed writers. The lessened birth-rate in France is simply response to nature's directions. If France succeeds in changing the marriage law, and eliminates the idea of the dot, it will still be found that little result has been obtained because France is a double rose garden. A nation consisting so largely of double roses has nearly reached its limit of protoplasmic development, and when any one nation is developing too rapidly out of proportion to other nations, or has, like the oak tree, reached its protoplasmic limitations, nature brings her agents into the field and restores order in a large way. We cannot select any one social factor or any group of economic factors which will explain the lessened birth-rate. The double rose idea explains it. The manly and womanly French of Canada do not worry very much about their dots nor about relatives' consent to marriage. In the fresh air of that country, and the hard conditions of living, their soma cells take proper charge of the germ cells and both sets work normally together, indicating the grand fundamental strength of the French.

In a crude but established eugenic feature, the marriage

dot has been a peg to which captured imagination was often hitched, but it has been used largely by men who felt too feeble to get along without help. A strong self reliant man commonly spurned the marriage dot. He preferred to lend a hand to someone who could not get along well without his hearty masculine assistance.

It is really fortunate for any young woman to remain unmarried if her suitor is attracted by her dot. The woman is good enough without it, and any man is a weakling who gives chief consideration to that feature of her desirability. Think of a strong man capable of self support allowing the question of the dot to stand in the way of his marrying a valuable, adorable helpmeet.

One should look upon a dowry dot for a wife very much as he would look upon a musca dot on a painting,—or rather as a musca dot on a musical score which might lead to the playing of a false note by the near-sighted musician, who mistakes it for a symbol. A girl with a dot, if the dot attracts attention, is a musical score with a musca dot, which leads to the playing of a false note by her suitors. Men who consider the dot to be a blemish are the very ones whom the dotted do not meet very frequently. I have known some magnificent women in countries in which the marriage dot is customary. They were prizes on earth for any man wanting a combination of cleverness, thrift, generosity, spirituality, common-sense, tenderness, sympathy, health. Any man looking for a dowry in addition to such a combination would seem to be an undesirable sort of citizen, yet I have known some men who would look first to the dot and take chances on the rest.

Before taking steps of approach to opportunity for the love psychosis in the monistic unity state, a young man or a young woman will first decide rather definitely upon casting lots with the exhibition set or with the brotherhood-of-man set, in social

life. These two sets are quite squarely opposed to each other. The individual who wishes to belong to the exhibition set will develop ideals of a partner with wealth or social position. The one who prefers to join the brotherhood-of-man set, will look about for a helpmeet to whom he or she can be most useful. These two latter will be the ones who laugh along through life, no matter what happens. The exhibition pair will have, oh, so many disappointments, and each will wonder at times if a better bargain could not have been made by waiting a little longer.

In addition to choice in marriage which is based upon the marriage dot, another shadow of the coming event of eugenics has been cast before, in the exchange of money for social position. This is a commonplace event among Elims of the fashionable exhibition group. Shylock was not allowed by law to take a pound of flesh because blood would be wasted incidentally, but frequently enough a woman trades her money and throws in her heart, no matter where the heart's blood may spill, if social position is given in barter. The barter of a large marriage dot and heart's blood in exchange for social position, represents a crude and barbarous stage of eugenics, but the principle is not different from that which will guide in scientific eugenics, when choice is to be made upon the basis of a prospective merger of finest human qualities. Marriages of convenience based upon material consideration have been a destructive element through their interference with moral progress, but marriages based upon eugenic ideals will be constructive in all their tendencies. One can hardly appreciate the dulling of sensibility that goes with marriage for material consideration, unless he knows inside histories as we doctors know them. The feelings of even a common plaything woman may be more delicate than the feelings of a woman who exchanges money for social position. I well remember one

of the former who objected to remaining in the hotel room if the gentleman's valet was to remain in the same room during the night, according to his custom. The gentleman was to marry an heiress the next day and he was to give her great social prestige. Society reporters did not state if the valet was ejected on the following night also, but marriage does no doubt break into some established comforts. One of my friends of the ultra-fashionable set was having much distress over his divorce complications, and the "society columns" at that time were filled with clever levity and jests at his expense. One day we were sitting quietly together discussing a question of variation of molecular weights under influences of temperature conditions, when he changed the subject and said, "Do you know, Doctor, what a delight it would be if one could have a wife who was interested in natural science? But I have never been brought into contact with women of that type of mind." The difficulty which a man in his position would find in coming into contact with the most wholesome sort of women had never occurred to me previously. Socially ambitious mothers had seen to it that he was overwhelmed with attention, and under the influence of their really wonderful wiles he was unconsciously bound. He had never been free to do his own seeking for a wife, although he imagined himself to be one of the freest of the free. Here was a man who would have made an ideal husband. He was brave, generous and kind, thoughtful for others, and an admirer of the substantial virtues in other people. He cared much less for social exhibition than he did for the sciences, and was never so happy as when wearing old clothes and working out some mechanical problem in a practical way with tools. This side of his nature was not commented upon by society editors, in fact it was not a field in which they were prepared perhaps for becoming interested. Because of his wealth and social

position he was married to a most estimable woman who really wanted to marry some one else at the time. Planning on the part of a socially ambitious mother nullified the value of two lives. In due time the customary scandals began to be noised about. What a pity that two such extremely valuable members of society could not have been married to other people, on a basis of choice founded upon scientific eugenics. Such a basis does not restrict the freedom of fancy, but only serves to give it better direction! Both of these unhappy people could have exerted tremendous potentiality for good, because that was the natural inclination of both.

Warfare between husband and wife may possibly represent one of nature's ways for lessening the size of families of children.

The feuds among our Southern mountaineers represent part of nature's plan for limiting population, and the feuds are but an expression of a natural instinct. Warfare is incessant among savage tribes in proximity to each other. It seems to be a working of nature's law for keeping down population.

The clergy have often been accessories to actual murder. By that I mean warfare between nations in the religious wars. Any warfare in which people are killed is murder on a wholesale scale, but is not looked upon with such disfavor as are more quiet or more local private murders. The principles are the same in both cases, and there is no difference between a ruler who signs the paper which precipitates a battle, and the gambler or thief who shoots a single man. Where a religious motive begins the battle, this serves simply as a priming factor, the fight then revealing its larger elements in struggle for power, for revenge, and for the possession of property. Where the clergy have been responsible for precipitating wars it simply furnished the jar which started the geyser of human

nature into its periodical demonstrations of violent action. The fringe of associations belonging to warfare is not different from the fringe of associations belonging to the life of the gambler or the thief. There are the camp followers, who poison and prey upon the soldiers, there are the traitors shooting themselves "honorably" when trapped, or being shot by others. Dealers in war supplies obtain government contracts through the bribing of officials and they present fraudulent bills for goods delivered. There is the dragging trail of pensioners of a disreputable class who are used for purposes of corruption by the politicians. All of this is carried on under the flags waving with exalted legends of Honor, Justice and Christ.

When the Spaniards entered upon their conquest of South America they showed the native people the point of the sword before showing them the handle in the shape of a cross. A sword handle is the proper symbolic form of the Cross, as it has been applied to history. This is simply a glorification of murder on a large scale and not differing in any essential from a private murder by a gambler or a thief, whose environment and life is generally quite as disreputable as the environment of the more dignified battle field. The public, as a whole, which participates in the wholesale murder of warfare, sophistically justifies itself, but so does the quiet private murderer. Condensing the whole subject again, we find ourselves arriving at the principle of the blue fish swallowing the herring, the only difference being that the blue fish is frank about it and introduces no element of sophistry—sophistry belonging to the higher intelligence. Wholesale murder, and the swallowing of the herring by the blue fish, considered from a still simpler standpoint, mean nothing more than survival of the fittest and the avoidance of over-population.

Women find it difficult to understand why men should con-

struct battleships costing millions of dollars when the same amount if turned to education would be of such enormous potency for good. This feeling is based upon most commendable ideals. If one imagines, however, that no warfare occurs between women, he should attend a meeting of teachers or of advanced women of almost any sort. He may hear nothing about 13 inch guns, but he will hear plenty of 13 inch remarks. Now this is the same thing as warfare between countries, excepting on a less broad scale. The same spirit is present at women's meetings as that which is manifested between warring countries. This spirit, phylogenetic in character, extends all of the way from the first fight between amœba and microbe, up to the employment of 13 inch guns, incidentally including the use of 13 inch remarks among educated people who are bent upon furthering such a good cause as that of moral and civic betterment.

Are women really less barbaric than men? When speaking with a beautiful young girl not long ago about the desirability of not "knowing things about other people," she replied: "Goodness! That may be all right, but I would crawl a mile on my hands and knees in order to hear something that I heard today about another girl. It will kill her dead in a certain set." As a matter of fact there is as much brutality in one sex as in the other, but expressed in different ways. We are good chums for each other. Come, now, let us be as good fellows as nature will allow, both complementary and complimentary!

Nature has conducted evolution and the regulation of population with man, by setting man plus microbe on one side of a given question against man plus microbe on an opposite side of the question. In earlier days there were short, sharp military conflicts at frequent intervals for the purpose of settling questions. Man then predominated in the killing process against man. As civilization progresses men kill each other

less proportionately, but microbes kill more men proportionately. The periods between occasions of military warfare become longer, but the end-result is the same, and is not changed by the fact that in the course of the limitation process one factor in destruction (man) is more active at one period, and another factor (microbe) is more active at a later period.

When the returns of the battle of Bull Run were reported to Lincoln he burst into tears of sorrow and chagrin. What ruler has burst into tears of sorrow and chagrin over the loss of life from preventable diseases, each one of which kills more people every year than were killed at the battle of Bull Run?

We must remember that man is only semi-domesticated as yet. He cries before making sure that he is crying about the right thing. Up to the present time we have had nothing but a sort of wild growth of nations upon this earth. People of some of the more cultivated nations during the next couple of æons will laugh at the history of the sorry plight of twentieth century man who stood midway between lost instincts and acquired reason.

In some parts of South America the death-rate in native villages from the microbes of smallpox and of typhoid fever alone amounts to about thirty per cent. of the entire death-rate, year after year. When we consider the large number of species of microbes which are represented in the different infectious and contagious diseases, it is probable that the microbe takes practical charge of the question of over-population in all parts of the world, and this is now found to occur in increasing degree in Africa, where warfare between tribes is prohibited by European rulers. Such warfare has always formed a considerable part of the employment of the best men in different tribes. These men, now having little occupation, are being carried off rapidly under microbic influences. It is merely a question of comparative cruelty, allowing them to

kill each other or sparing them for the microbe. There is some doubt if we really need have much fear of over-population as a result of prohibition of warfare between tribes. There is some question, however, if there is any lessening of cruelty, through choice of the microbe method. In warfare by arms, population is kept down by open killing in the field, but there is probably less suffering in frank military warfare than when the surplus of people is killed off by microbes insidiously. The question would seem to be one of choice of method, rather than one of humanity, when tribal wars are controlled by a dominating nation, and populous tribesmen are turned over to the mercies of microbes. Among uncivilized tribes a dominant race often exercises control in the matter of killing by arms, and among civilized peoples the bankers limit this sort of killing; but in both cases the microbe, as usual, remains supreme in exercising final control in regard to over-population. Among civilized peoples the microbe brings breeding to a close, as well as killing the weaker part of surplus population; but among wild tribes the microbe exerts its power in maintaining the balance of nature by destroying strong and weak alike, through the action of its infections. If thirty per cent. of the population in some parts of South America is killed off by the microbes of two diseases alone, it indicates that the danger of over-population need cause little alarm. Nature has to carry out her plan by continuing the warfare, but the warfare instead of being between tribes is between tribe and microbe. Warfare, just the same,—difference being only in the relative size of antagonists!

Peace movements have no distinctive value in a saving way excepting to give civilized people a sense of comfort when dying off, very much as people now enjoy easy chairs in place of the rocks upon which they formerly sat. A great fund devoted to the subject of peace simply hurries a nation toward

highest development and quicker degeneration. The light burns more brightly, but the arc of the light has a narrower base as the apex is heightened. Peace funds disturb the balance of nature, and will have a tendency to cause a more brilliant rapid burning out of those nations which are not intended to be very durable under nature's plan.

The notes which relate to warfare were written chiefly during Summer vacation time on the farm in 1912 and 1913 before the breaking out of the European war, which many of us feared was impending and which is under way at present writing. It was my own feeling that we would probably have to step into Mexico and that the general blaze bursting out from that focus would reach Europe by way of South America. It has seemed best to allow the warfare notes to remain for the most part as originally written, but at this point to recapitulate some of the ideas and to place them in alignment with the report of an interview which I gave for the editor of the "Evansville Courier" on August 21st, 1914, together with the substance of my later article in "Harper's Weekly."

Why is it? Why is civilization unexpectedly committing suicide? This is a question that will be asked many times in wonder during the next ten thousand years whenever highly developed nations go into warfare with each other suddenly.

In olden times it was a witch or a fairy who gave answers to riddles. Now-a-days the naturalist, answering the warfare question, points to the cider barrel. Therein lies a solution of the problem.

The yeast plant, Saccharomyces, living in the midst of plenty (sugar) and growing thriftily, soon commits suicide and leaves the cider in charge of a vinegar microbe. This tragedy comes to pass because the Saccharomyces has reached cultural limitations. The phenomenon belongs to a law of nature. Every family group among plants or animals

receives its respective allotment of protoplasmic energy from Mother Nature. Nations are family groups. Having received their given number of protoplasmic talents, each nation then proceeds to undergo development to the limits of its capacity. Nature does not wish to have progress in civilization made too rapidly,—otherwise we would accomplish everything all at once and the game of whist would be over. Under the guidance of Kaiser Wilhelm, Germany had been making almost explosive progress in civilization,—a pace too fast for the rest of the world, or for its own people in detail. When nations are developing out of proportion to the times, nature asks them to trim each other back. Civilization does not actually commit suicide through warfare. It simply makes the attempt and then goes to jail for a spell.

Let us take up the question from a point even farther back than that of competing organisms in the cider barrel. Historians like to go back to some one objective point and say that the causes for any given war date from that time. This idea is academic and according to tradition among historians. Tradition is the greatest of guides for minds of the mean type, and the meanest of guides for minds of the great type. A transcendent mind finds no "beginning of causes for war."

Inorganic warfare occurs between different elements in nature which seek for advantage of position according to the code of Periodic Law. Certain inorganic elements finally succeed in forming the organic cell. An organic cell consists of protoplasm, the fundamental unit of organic life. The low form of organic cell, an amœba, immediately finds itself engaged in warfare with another low form of cell, the microbe. The amœba is nature's chief constructive agent;—the bacterium (microbe) is nature's chief destructive agent. Both agents enter into a contest with each other, and as unfairly as possible. When a certain amœba has succeeded in warding

off the microbe until in the course of evolution it can throw up defenses in the form of sets of aggregated cells—each set with special function—the separate cells proceed to enter into increasingly active disputes with each other. A protection set belonging to our amœba now represents the soldier. A nutrition set gets to represent the farmer. (A procreation set attends to increase.) We have then in the simple problem, presented by an organized amœba, farmers and soldiers not in full accord with each others' points of view. In addition a deadly enemy, the microbe, awaits outside—watching for opportunity to kill the entire organism in case the quarrel between farmer and soldier offers a favorable opening for the microbe. Every one of the higher forms of organic life (man highest) consists of a community of aggregated amœbæ. These communities of aggregated amœbæ enter into warfare with each other. Example—a pike swallowing a bass. According to the laws of continuity, warfare which was under way in the inorganic world is extended to become a contest between simple cells, and is further continued between higher forms of organic life. Additional examples—pigweed versus cabbage, England versus Germany. Synchronously with warfare between higher organisms, the microbe incessantly seeks for opportunity to prey upon all contestants in order to supply its own larder. Example,—five hundred Austrian and Russian soldiers in one hospital, suffering from dysentery.

We assume that nature's object in forwarding incessant warfare consists in an evolution scheme ending with "survival of the fittest." Family groups of organisms when not destroyed in the course of warfare, reach cultural limitations. Their protoplasm becomes senescent, and they enter a stage of natural decline. Examples—scarlatina epidemic running out. Fall of Rome. Decline of the Morgan horse.

Under conditions of peace, marriages become fewer and

fewer, and fewer children are born to those who do marry. These few children have a marked tendency to develop genius, tuberculosis, cancer, worklessness, insanity, and high cost of living. Nations with loss of protoplasmic energy are now beginning to fail in their conflict with the microbe. The bell will ring midnight for them when the hour arrives for their departure.

Germany has recently given evidence of approach to cultural limitations. She has begun to follow France and England in rapid decline in birthrate. When birthrate falls toward deathrate in any group of organisms, we simply have a repetition of history exemplified in the cider barrel, and in Rome that was. Could Russia be patient enough she might eventually possess not only Germany but England and France also—without firing even a pop-gun. (Outbreeding.)

Nature's end of limiting population is attained by two chief methods, which we may term "secret" and "insidious." These two terms are not used as synonyms in this note.

Let us first consider the secret method, which is perfectly well known. The secret method consists in diplomatic duplicity carried on at the instance of politicians, army and navy officers, and manufacturers of arms and ammunition. The immediate personal interest of these people in warfare is so great and their responsibility so much less than that of the actual rulers, that they feel obliged secretly to bring about conditions which make it necessary for the actual rulers to press the button and send people into warfare by arms.

Nature's second or insidious method is also perfectly well known. Any species of plant or animal is allowed to develop within certain limitations. When natural limitations have been reached, nature leaves the protoplasm of these individuals exposed to attack by microbes in constantly increasing degree. Thus, both higher and lower forms of organic life

are continuously at warfare. Under conditions of warfare by arms, population is limited through the aid of shot and shell. Under conditions of peace, development is limited by the running out of the protoplasmic energy of nations, which have reached or approached natural limitations.

Although both the secret and insidious causes for the limitation of population are thoroughly understood, nature does not wish man to act in accordance with his knowledge. People will continue to talk about the various motives for war as jealous, religious, revengeful or what not, but which are not fundamental nor even satisfactorily comprehensive to the historian of any one country who is writing about any other country.

Warfare by arms as an expression of organic consciousness may be placed upon a biologic basis for purposes of philosophic consideration. Whenever emotions are greatly aroused as a result of the application of some influence that is unusually stimulating to the protoplasm of our body cells, energy may be transmuted from that form which naturally leads an organism to follow every emotion with its appropriate action. The transmuted energy expands into what we may call the hydrogen form of emotion. It is less compact yet more powerful than before, lifting our feet from the safe ground of ordinary daily procedure. An object lesson illustrating what I mean is to be observed in the chicken yard. When a hen becomes greatly agitated she is quite as likely to fly into the creek as into the coop. She has gained her wings, but has lost her head.

The shade of Fichte would say that an explanation for the present combination of nations against Germany, lies in the fact that Germany since 1870 may have risen to become the strongest of all nations, in everything that civilization means. It is true that Germany has of late years shown a haughty

nouveau-riche arrogance in quite as great a degree as the patrician arrogance of Great Britain, the ursine arrogance of Russia and the hunger arrogance of Japan.

All nations which are now engaged in fighting pray to one God, basing their prayers upon the justice of their respective causes. The God of nations is therefore a garbled God, but final decision will be made by the God of nature, Antecedent Mind. Antecedent Mind has decreed that warfare, to use a physical picture, shall at all times retain the same cubic contents. Being viscous and engaged in rotary motion, let us say, its energy is expended first in one direction and then in another direction. Such being the case, if Germany is defeated the conquering nations may then repeat old history as exemplified in recent Balkan wars. They may tear up treaties and turn to rending one another again with newly acquired methods of destruction.

A somewhat parallel history would naturally belong to Mexico. We would look for an attempt at the speedy unseating of Carranza by Villa; then a prompt attempt at the unseating of Villa by Zapata, *et cetera*. The naturalist would anticipate the recurrence of revolution in Mexico after short intervals of armed peace during the next few hundred years. The reason for that is because Mexico is populated by specific hybrids.

When the present military and naval warfare in Europe is all over, nothing will have been gained excepting nature's points of insuring food supply through control of overpopulation, and the preventing of cultural development that is out of proportion to the times. Military and naval warfare having subsided temporarily, warfare, still retaining its original cubic contents, will return to expenditure of energy in commercialism, feminism, vendettas and in renewal of oppression of Jews and Poles, for examples. These minor wars of peace

possess widely distributed capacity, but undiminished total energy.

The sympathies of people of our United States cannot be brought into static position for or against any one of the warring nations. Each one of them, guided by inner political and diplomatic gyroscopes, has felt obliged to act very much as it has acted. The attempt at placing our sympathies upon a static basis is very much like trying to find religious truth, something that does not exist excepting as a useful fantasy for employment in constructive endeavor. Deep and genuine human sympathy should be extended to all the nations which are now in dire distress. The war was not due to the fault nor to the responsibility of any one of them in particular. It represents nothing more than response to conditions like those which have formed in the past and which will again become assembled many times in the next ten thousand years when two groups of dominant protoplasm come into conflict over the question of dominance of one group. Centuries ago Aristotle and Polybius showed that cultural periods proceed from barbarism to democracy, to aristocracy, and then revert to barbarism again. The present-day civilized nations having arrived at the stage of aristocracy on this cultural trip (capitalism representing aristocracy) we recently seem to have evidence of a movement back to democracy through the growth of socialistic doctrine. This, however, would not be according to biologic laws as they are related to the species of *Homo-sapiens*. We must go back to barbarism again in all probability, but no one can tell if this will follow upon the present war, or upon some second or third war later.

The next period of barbarism will naturally consist of the Slavic sweep. Our hope is that this is not to occur during the lifetime of the present generation. When it does come there

will not be as dark barbarism as that which has followed atavism from aristocracy after previous cultural periods. It will represent a large degree of total progress of the entire human race. Occasionally we hear an expression of belief that the present conflict of nations will be the last great war. This represents hope, but not history. The hope that this will be the last great war has no justification in natural history nor in human history,—which is simply one phase of natural history, and never for a moment anything else. In the millions of years which are to come there will probably be hundreds of "Last Wars." At this very moment experts are making careful analytical study of all the weak points in new war methods which are undergoing test. For what purpose are experts making such study? For the purpose of their conclusions for application in preparation of the next great war. Vast capital is invested in war supply interests.

Warfare by arms will probably never cease. It presents a natural phase of nature's established method, dating back to infinity before the beginning of organic cell construction at one end of the history, and illustrated by the dog with the biggest bone at the present end of the question. In the monistic unity state the terms of military warfare and of microbic warfare in relation to the question of population, will be taught students by a professor who holds the Chair of Comparative Cruelties at the University. In case of a strong menace of war by arms, there is always one factor which lies outside of human computation, that is, the instinctive desire to lessen population in the interest of the food question. Various authors have disagreed with Malthus on this point. Others retain his viewpoint and attempt no sophistry relating to psychologic influences. Right now the whole civilized world is so ready for war that a call for recruits in almost any country would result in an overplus of applicants. The long

restraint under conditions of refinement has become unendurable to the crowd which yearns for a respite. Warfare is popular. The crowd wishes to take a long breath and return for a spell to the brutality which has followed us all of the way from the jumping shrew to the lemur, to the anthropoid ape, and to man. The newspapers of any warring nation when engaged in creating an illusion of nobility and purity of purpose have to lie like Satan in order to enthuse the public with a proper spirit of patriotic good cheer. The censor of news dispatches must always have the latter idea in mind, rather than an idea of sending whole facts to the press. Anthropologists tell us that in all probability not more than five million years have elapsed since the time when ancestral man first got up on his hind legs habitually. This attitude gave him increased opportunity for free use of his fore paws, and the brain developed in proportion to meet the new conditions. Man tries all sorts of stunts with his newly found toy of a developed brain. If he believes, however, that he left brutality behind when mutating away from the jumping shrew, he may always check up this idea by referring to the object lessons offered by a boy with a toad, a Lambeth Conference of Angelican bishops, the behavior of women toward a pretty sister who needs moral help,—or by the feelings of a college faculty toward a genius in its midst.

No matter what the diplomatist may do, no matter what wise men decide upon in council, a strong public undertow of instinctive feeling fostered by the war clique, may engulf civilized military or political leaders at any moment and render them helpless. There is, perhaps, no more profound instinct subtending all peculiarly human actions than the desire to kill off the imagined surplus of our fellowmen, in countries which have not as yet developed intensive cultivation of the land. A lighted match is always being held between the fingers of

army and navy officers, and of manufacturers of arms and ammunition. These people, because of their personal interest in warfare, require the very closest of watching. Secret diplomatic duplicity causes match accidents. Historians call attention to various causes which have led up to warfare at times when people were really hoping for peace, and when rulers and diplomats were honestly engaged in averting dangers. Historians of four countries write about the subject in four different ways, sincerely—and all of them at sea. Even when the unbiassed collaborator of facts obtains official papers for purposes of reference he is little better off, so far as the *casus belli* question is concerned. One reason for this is because we are not far enough along in sapiency to ascribe true values to the two most potent influences which lead to precipitation of war.

The first one of these impelling influences may be labelled "suggestion." Psychologists tell us that every mental process passes into action of some kind. Ruler Number One is at all times unconsciously suggesting to Ruler Number Two the desirability of Ruler Number Two exercising ordinary prudence in arming himself just a little in advance of Ruler Number One. Suggestion is followed by action. Ruler Number Two then becomes Ruler Number One for awhile. Soon they exchange relative positions again, the cost being paid by the citizen. Rulers themselves may not really understand just why they are going into war with each other and the people wonder what it is all about. They may be thinking peace and talking peace, yet all the while moving toward war. A simple object lesson illustrating the power of suggestion may be observed when a bicyclist sees a dangerous stone in his path. He wishes to avoid hitting the stone, yet his muscles are coordinated in action from subjective mind impulse which is stronger in degree than his wish impulse. Armaments are

muscles Diplomats are wish impulses. So much for the suggestion question.

A more powerful impelling influence heading toward precipitation of war is mechanistic in its nature, and quite overlooked by the public. Rulers are at all times in fear of sleeping and allowing the rats to collect about them. The fear of remaining inactive comes into conflict with the fear of consequences of action. As a result of two kinds of fear-force being in conflict with each other, a vast store of energy is liberated within treaty tanks. These tanks are capable of standing the strain of expanding fear-energy up to a certain degree of tension. A political murder or some trifling outrage suffices to unbalance the reciprocating charges of fear-energy. An explosion follows, at a moment perhaps when diplomats are looking the other way. For such reasons warfare by arms apparently cannot cease. The periods between disrupting explosions will be of longer and longer duration as civilization progresses, for the same reason that a tree with its system of complex sap channels now lives to a greater age than did its primitive ancestors. We have in this fact an illustration of the idea that nothing in this world is very different from anything else in this world when judged from a standpoint of the laws of continuity.

When a war has been completed people return to thoughts of the spiritual, of the beautiful,—of everything which leads finally to peaceful physical and moral decadence of a nation. We do not know the ultimate significance of these alternating movements of peace and of warfare by arms, any better than we know what took the place of time a week or so before the beginning of time.

The compensating side of warfare may be observed by those who look for compensations. For instance, a general European war might be worth its cost provided that it resulted in

the final disposal of dynastic government and the "ruling by divine right" that has aroused a feeling of such deep dread among civilized peoples. Ruling by divine right in the very nature of its idea flatly rejects the opposite idea of brotherhood of man. When two or three agents of God arm themselves heavily against each other, constitutional governments appreciate the humor of the situation, but are none the less obliged to follow suit for their own protection. They know that mere man-made treaties will be violated in the interest of Divinity whenever sufficient occasion arises. If civilized people cannot stand upon treaties they do not know where they can stand at all because men are taught with a mother's hand upon their heads that In the beginning was the Word. Civilization breaks him who breaks the word.

Another compensation of warfare consists in allowing a neutral people to determine which individuals among them become partisans, and which ones maintain their judicial attitude under conditions of stress. When the nerves of a neutral people have become all raw as a result of the sawing back and forth of mutual recrimination between people at warfare, the deeper natures of neutral people are exposed. When the air is all full of shrapnel epithets of "treachery," "perfidy" and "villainy" trained to explode over the trenches of great warriors, certain ones among the neutral people begin to dodge. They realize the fact that whoever is hurling those epithets is quite right, because the epithets describe parts of human nature which come bulging up to the surface in any country, when war has burst the lid of civilization. A neutral community makes rapid note of those members who begin to dodge when chants of hatred are being sung by people of one country against people of another country. A community is always on the lookout for individuals who may be placed in positions of great responsibility and trust. Many people so conduct them-

selves as to give an impression of excellent balance ordinarily, yet in times of stress they may suddenly become partisan dodgers. This allows the community opportunity for avoiding people of partisan tendencies, when positions requiring granite poise for exercise of justice are to be filled later.

The sporty nature of warfare by arms is shown in the pride of dress for officials in the game, and in the choice of weapons and missiles. There would be very little need for infantry charges against a fortress if a few bombs of liquid carbon dioxide or of liquid dicyanogen were to be thrown into that fortress. The men in the fortress would lie down asleep in their tracks. This, however, would not be sport. It would be like netting quail, and is not permitted, I believe, according to the rules of the game. Bombs of liquid ammonia thrown into the trenches would soon place trench making among obsolete methods in warfare. Rules are made against releasing deadly gases or placing poison in wells. Is that not as truly sporting spirit as the spirit displayed by student duellists when they employ measures against hurting each other indefinitely? In the days when warships used sails, a British admiral told a Dutch admiral that he could not take his fleet out of the harbor to fight because he was short of spars. The Dutch admiral offered to loan him the spars.

Military warfare is grand sport for officers, but when a dead soldier's arm has been pulled out of the mud into which it was ground by an artillery wheel, the hand may be found to clutch a bit of paper written in a childish scrawl—"Please come home soon, dear papa. The garden is all full of weeds. I have learned to help sister ever so much around the house, and you will be proud of your little girlie when you come home again. I wish mama would not cry so much. Sweet kisses, dear papa. We push our noses hard against the window-pane every evening after supper and make believe that

we see you coming up the street, and a hundred kisses are all being saved up."

When highly civilized rulers allow human brothers to make bright red blood spout squirtingly all over the shoulders of shirts that had been wet with mothers' trickling tears, and when the photographs of sweethearts get splattered up and mussy with loose pieces of brain, men who remain among the living prepare to bend and stagger under a war debt for a generation subsequently. Nicety of taste among civilized rulers has dictated the sparing of women and children from massacre, yet massacre belongs to nature's plans for limiting population, and furthermore may be merciful, because poverty leaves women and children exposed to the microbe and to the harpy. A neat slicing of each baby's tender throat done quickly with a bright sharp sword in the name of Christ may belong to really advanced method.

Then again there are the atrocities. Each nation charges up barbarous acts of individual soldiers to the whole of the enemy's nation. Let us neutrals be reasonable about that.

There's the street of the gutter that flows with free wine in a town by the name of Loot; do you know of no man in your own home town who would like to be there for an hour? Would your somebody man not break down a church door, or grasp a clean waist with soiled hands? Then, when he was through, and the news gone to press, it would be your home town that had furnished such men for the street of the gutter that flowed with free wine.

Do you know of no woman so partisan bent (and of breeding that carries no record), who would not if drunk vent her rage on a foe—a wounded man, helpless, who could not escape when her concept of damage took on some weird form. No matter what country, no matter what folk, there are always the weak ones, the strange ones, the drunk.

The committing of atrocities may be a particularly human

sort of action, having origin in fine feeling,—to wit. When half dull fellows are thrown together as regiment comrades, they develop that best of traits, friendship for each other. (Home reminiscences, hot plum pudding, sweetheart's letters, closely huddling together when shivering in the rain at night, dividing one cigarette.) Watch this dear chum's head flying to pieces, and tell me how you would feel toward a people known only as "enemy." Assume that like other common soldiers you "care not what the cause may be," and you are "not nice for wrong or right."

In case of warfare between nations neutral peoples unconsciously allow feeling to develop against the nation which they believe to be the strongest. The reason for this is fundamentally the reason which led the warring nations into conflict with each other in the first place, namely, aversion to allowing any one nation to gain supremacy over others and to hold in consequence a controlling influence over food supply and culture. Human sympathy goes in bulk to the nation or nations which are believed to be weakest. It is among these latter people that a neutral public seeks for its heroes, and for opportunity to express emotions of public sentiment in the degree that is always aroused when warfare liberates intense feeling.

Warfare represents a part of the great human question, and more basically the entire organic struggle question. Officers who have "influence" enough as well as the ones exhibiting remarkable bravery receive jingling trinkets of decorations. Prizes are divided between men who gloat over the booty, and God is given honorable mention.

It is reported that fourteen different wars of more or less interest to civilization are under way at the present time in different parts of the world. This is perhaps not a larger number than the average, year in and year out. The world as

a whole is not vitally interested in the struggles of Tuareg, Haitian, Venezuelan, or Bushman; yet, the sound of all wars if brought together within one hearing distance would make a continuous hum like that of a great wheel. Frederick the Great prophesied that wars would recur after intervals of about five years. During my fifty years of observation the wars of direct interest to Europe alone have recurred about once in four years.

Civilized society stands upon a tripod composed of three individuals—soldier, priest and taxpayer. Sometimes priest and soldier have acted in concert, persuading the taxpayer to foot the cost of their combined games. More often, however, it is the soldier alone who demands that the taxpayer shall pay for his game. The people who are expressing a belief that the last great war is now upon us are chiefly the taxpayers. Sick and weary of the whole miserable affair, contemplating the horror of it all, they cannot believe that civilized human beings will allow another such war to occur. Yet minds of an entirely different sort are quite as actively at work. The soldiers are as busy as ants getting points out of experience to be employed upon the next occasion for the playing of their game. They will be impatient indeed if some Danton does not collect the disheartened forces and hurl them at some enemy. They will ask the taxpayer to consider the honor of his country. When a soldier of any one of the great civilized countries steps before the foot-lights and raises one hand in an honor appeal, he waves the other hand behind his back toward the prompter *yenseits der Vorhang* and says in a low voice, "Hush, hush, don't remind me of that!"

The taxpayer in times of peace places the soldier upon exhibition as his representative for correctness in cultivated demeanor and dress—as one having the time to look after such

things. The taxpayer at all times places the priest upon exhibition as his representative in ideal morality—as one having the time for such things. Having given position to these two representatives of his ideals the taxpayer proceeds about his occupation like the busy man who tacked The Lord's Prayer to his door and every morning pointed at it when passing and exclaimed, "Oh, Lord, there are my sentiments!" The taxpayer forgets that soldier and priest really remain alive and active. He leaves two candles burning in the attic while he is bustling around downstairs with the goods, oblivious to the fact that when candles become upset they transmit combustion. The general as a servant is sometimes a particularly nasty one to handle if his vanity has led him into taking social petting seriously—if he believes that social attention is for him personally instead of for him as representative of an ideal.

While the present war is under way we shall learn from the daily papers of each side that both sides have made great gains on the same day. When the war is over officers of the defeated army will explain to the taxpayers how easily they would have won If certain unforeseen events had not come to pass. They will be restless in a consuming desire to try out these Ifs once more with a new and fully equipped If army. On the other hand, officers of the winning side will require some time for quieting down. They will think it a pity when the taxpayers refuse to allow them to make prompt employment of valuable victorious experience before the experience has cooled off. There will be much grumbling when the taxpayer asks them to wait until he has supported all of the paupers resulting from the playing of their game; to wait until he has built up again the shipping, factories, and hearthstones that were lost, before an adjustment of desolation had been made. The taxpayers will gradually store up again

great quantities of capital in order to serve the war clique when it again tricks the public and obliges industrious people to play into its hands.

Meanwhile, the jealousy of officers toward each other in any one country will have to take the place of fierce attitude toward more distant enemies. Court camarillas are under way at all times among gamblers for the stakes of position.

The reason why all of the countries engaged in the present war are apologizing for taking part in it, is similar to the reason why the character of Philadelphia is different from the reputation of Philadelphia. We are dealing with two very separate elements. The character of Philadelphia depends upon its politicians; the reputation of Philadelphia depends upon its great, noble, peaceful and industrious citizens. The countries which apologize for being in this war are sincere so far as their statements go, but their statements do not make frank acknowledgment of their having been tricked by the war cliques.

Germany will presumably be defeated in the present war because of the "unfair action" of allies in bringing superior numbers to exercise posse police function over a nation which first shot up the town. It is quite possible that some other nation might have reached the limit of human endurance before long. Resort to arms means bankruptcy in governmental resources, no matter what assets in culture may remain in the treasury of a country at the time. In this particular war Germany happened to be the nation which started just in advance of the word "Go!" because she first reached the limit of human endurance.

After the war we shall have a greater German people than ever before, if war indemnities do not cripple them to the point of stunting. New greatness may depend upon the turning of armament funds into the education of Herr Sandmann;

teaching him plant physiology and intensive cultivation of the soil, shooting at his toes if necessary, if he does not keep step in line. The index of civilization in any nation of the monistic unity state will be the extent to which plant physiology is taught its unwilling farmers. The virtue of one age may be the vice of the next. It is thinkable that Germany needed militarism in order to establish her present position. Militarism was an useful passing incident which became eventually a burden for the State, preventing further growth. When a lobster is filled with nutriment and new cells it has to crack its shell in order to grow larger still. The shell has served as a protection against enemies. A nation which has reached limitations of growth within a protecting social method needs to have that shell cracked by some internal bursting pressure (socialism, for instance) or some external smashing force (warfare by arms).

When military Germany turns its powers towards intensive cultivation of the soil as an index of its educational capacity, the naturalist would anticipate that military Russia combining with the Oriental forces would then be left to come into conflict with Great Britain and the United States,—perhaps a century from the present time.

We are distressed over recognition of the main contention of Treitschke that might is right, because we promptly fall into the fallacy of assuming that recognition of a fact calls for action. Just think what a lot of action that would mean! Carried to its logical conclusion it would result in there being only one man left in the world and he with a wife who would require killing in the interest of permanent peace. No wonder Treitschke disturbs us with his idea that war is an inevitable recurring punishment for man! Fill up the fallacy pit with good sense and we shall have good walking, in the idea that even the last man left to himself would be

subject to the right of a greater might than his—the right of the microbe to live—and the might of a still greater right—the might of nature to dispose of all organic objects when the proper time comes. Meantime nature likes to have a pretty nice comfortable sort of balance kept between opposing forces, and we are to fix our minds upon an agreeable judicial weighing of justice, rather than upon the idea of promptly going into "might action."

My own plan for solution of the warfare question is that of a simple-minded man. (1) Each nation is to arm just a little below the strength of its nearest rival. (2) The gap between relative armament strengths is to be filled in with moral strength. (3) These two steps having been taken, the logical conclusion is then to take its natural course.

A few thousand years from now we may hear a conversation sounding like this between a young man and his father seated in their wide-spreading one-story house upon the banks of the great Chicago River:—

S. Vjérno-li schto vnih vremenáh kagdá eta rjeká tjeklá tschéres dalíni Svjetóva Lavréntsa ljódi stschitáli na bajonéti i poolji v vajnjé?

F. Da, eto slotschílosj dásze dvátsatom vjékje.

S. Bíli-li dvatsatom vjekje baljschíja vajní?

F. Da, bíli dva, jesli ja vjerno napómnjo [consulting his War Almanac] vjerno, bíli dva. Pérvaja nazívájetsja "Vajná Opadánija Vóoroszénija." Pazlítschnija naródi ustróili vóoroszenija do takój stjépeni schto aní patjerjáli raznovjésije i v 1914 goda svalílisj ot svojéj tjászesti, sakruszája narodi katórije bíli pot nímí.

At some time in the future, guided by our desire for a return to simplicity in all things, we shall perhaps have a war known as The Ammonia War. This will come when taxpayers tire of the expense of maintaining cumbersome and

elaborate armament, all of which belongs to an undeveloped state of man's intellect.

After the phorologoumenoi have forbidden war gamblers to gambol further, when two nations find that they just simply cannot get on with each other, their soldiers instead of carrying guns and swords will be equipped with a back load of handcuffs and a long tube charged with liquid ammonia. A little biff of this ammonia in the face of each one of the enemy instantly disables him without hurting him permanently, but giving ample time for the adjustment of handcuffs. One side will then handcuff the other side victoriously at comparatively small expense. It will be found, however, after this has been done that the winners are losers, for the reason that the expense of maintaining hundreds of thousands of idle handcuffed prisoners will be so great as to draw heavily upon the resources of the country. This latter feature of the method will (like all other methods previously employed in warfare,) be found to be impracticable for purposes of permanent peace. All methods for maintaining peace will fail in the end, and the world will finally arrive at the method of agreeing to disagree in business matters and allowing the law of cultural limitations to take charge of the over-population question. This law suffices amply and in civilizations of the far future will take the place of warfare by arms.

After The Ammonia War and when all methods of warfare have been found to be impracticable for purposes of maintaining peace, historians a few thousand years from now will laugh and exclaim, "what silly fellows! Couldn't they have perceived all of this in advance?"

If it is worth ten thousand dollars to the people of one country to kill one man in another country, I am convinced that it is worth at least five thousand dollars to any one state to set up one man in business as a farmer in that state.

People who are not engaged in business do not always realize that business is warfare and that it suffices for satisfying nearly all human zest for contest. Business satisfies all martial needs excepting for the playful phase of contest in games. When all methods of warfare by arms have been found to be impracticable, and business is left as the only serious method in warfare, nothing but cultural limitation of a people can then inhibit the expansion of their country up to the limit of its natural capacity. This fact is not generally understood for the reason that philosophers and writers who expound the principles of national growth and of artificial restrictions to growth are not business men.

No matter what the allied countries do to Germany in the war which is now under way, the fine haughty Prussian protoplasm which remains in the end, will for a long time continue to exert influence of its own valuable kind toward domination. The future of Prussia is not to be dictated or presaged at the Hague. It is to be foretold by the biologist and the biologist will say that Prussian influence is not to subside as a result of any military or moral pressure. It must decline in due time according to the laws of protoplasm however. The date of decline may be foretold approximately when birth rate drops rapidly and when the drama without inspiring lesson is chosen for the stage—the mirror of a people.

Prussian protoplasm still carries such a sublime charge of energy that I personally cannot conceive of more than two outlets for that energy. Abrogation of the Monroe Doctrine in relation to South America or Africa would open one safety valve. Union of Prussian elements in other countries but with the understanding that they were to remain as allies of their respective countries of adoption would seem to furnish some sort of *modus vivendi*. Any one who imagines that Prussian protoplasm will remain quiescent under defeat in the present

war, cannot be looking at the matter from the biologist's viewpoint.

When England and other civilized European states go down in decline will other new nations start from the fragments? That has happened many times in the past,—a new nation starting from some fragment of a nation which went to pieces. We assume under these circumstances that some new varietal hybrid type was formed which became ascendant.

Historians of the future, when describing the rise and fall of different nations of the past, will include one feature of vital moment which has not been employed by historians as yet, excepting as an arbitrary observation. Students of sociology have called attention from time to time to the disasters which befell states because of decadent rulers, but these writers did not comprehend the reason for the abundance of such rulers. Their abundance has depended upon the working out of a single law, the law of cultural limitation.

There is one obstacle to the cessation of warfare by arms which is entirely overlooked by students of the subject. Sons of the elite coming from homes of cultural limitations are placed in the army as officers. Splendid fellows they are, cultivated always, erudite sometimes. They are not on the whole adapted mentally for work in the trades and professions, and nothing is further from their minds than the "Brotherhood of Man" idea. They bring a high degree of intelligence and skill to bear upon their profession of arms and from time to time will combine in efforts to persuade taxpayers into paying for their game in order to try out attractive theories.

When left to themselves as ordinary citizens, people who have reached cultural limitation are not inclined to marry, nor to have children in those cases in which they do marry for material ends. This fact safeguards the state against the

result of breeding between double roses. In ruling class circles, however, it has been necessary according to established system for double roses to marry as a matter of political expediency and further to have many children as a matter of political expediency. Politics—always artificial—has therefore forced the hand of the natural law of cultural limitations, with the effect of running whole nations up against the law of diminishing returns as it applies to expenditure of protoplasmic energy in family groups.

Warfare brings out not only the primitive and childish traits of the officers, but its influence extends to include the populace in that greatest of all prejudices, patriotism,—a noble expression of mentality, yet prejudiced! Patriotism is opposed to the brotherhood-of-man idea.

Under this influence learned men whom we revere as teachers sometimes lose their sense of proportion and demonstrate the limitations of great minds. That is a comfort for the rest of us. When a group of learned men unite in single-hearted effort to convince neutral people of the justice of a country's cause and the injustice of an enemy's viewpoint, neutral people smile quietly and sadly.

Rulers have always fretted over the "iron rings" that were being drawn about their people by enemies. There was Herod for instance, troubled by a disturbing nation of Jews, with various Cæsars threatening to extinguish him on one front and jealous grasping Rome situated upon another front, with no good buffer state in between. Poor Herod was left with no alternative. No doubt Dolichotus, the Euonym, persuaded the taxpayers that extravagant building operations had exhausted the public treasury, and yet, some way must be found for suppressing a prospective ruler who was at that time an infant. Herod in the interest of preservation of the state,

support of the throne and maintenance of public order was obliged to strike, first and fast. The slaying of the children of Bethlehem appealed to him as an inexpensive way for managing the statecraft of the situation, but such a frugal method is no more. It belongs to the good old days of simple ways to which we may never return.

Militarism is a state of mind, a quite ordinary psychologic phenomenon, which may become infectious when acting in concert with ovisness. Warfare by arms will cease only through the influence of impact of another psychologic phenomenon, a changed attitude in the minds of men,—not through change in their implements.

Would women in power in the different European powers have averted the war which is now in progress? We may judge from the history of their own movements. Different groups of women of the type who like to rule are in constant warfare with each other, and if their wars are not greater in degree than those of men, it is because they have not as yet established large methods in conflict. They have not as yet disapproved of each other in movements of national dimensions.

Kipling has had something to say about the deadliness of conflict which engages the interest of one sex. We must remember at all times that women are of two kinds. Those of one kind are not representative of the other kind. A woman who is naturally of one of the kinds may be perturbed because of a feeling that she perhaps ought to belong to the other kind. She may find comfort in knowledge of the fact that her discomfort is due to the insidious pull of ovisness,—a natural phenomenon. Opposed to ovisness is the pull of individuality, and the woman strongly individual will belong strongly and cheerfully to her own kind of women. Distress is caused when ovisness leaves a woman undecided about

which group is hers. Women, like men, will have to bring about changes slowly, through voting for candidates.

One does not realize to what extent nations are like individuals until he comes to observe the effects of dependence upon internal or external resources. The individual with internal resources sufficient for filling his mind at all times does not worry much about fame or fortune. He lives happily and conducts his duty in evolution inexpensively yet effectively. The individual who has to depend upon external resources for filling his mind, and who needs the theatre, novels and expensive accoutrements because of paucity of internal resources, finds it very costly to conduct his duties in evolution. A state is contented and at the same time progressive to the degree in which it furnishes its own internal resources. The state which depends upon external resources must go to great expense and with a less degree of happiness while it is about its work.

It is not unlikely that we may get on very well in the United States without a large army and navy, but in that case we must at the same time get on without exclusion treaties or Monroe Doctrines.

The Crown Prince is reported to have said that no war clique exists in Germany, all his people being of common thought in regard to defense. I passed this quickly out of mind as a mere news report, and as something which in all probability was not really said. The idea persisted in returning to mind, however, and I am not so sure after all but the Crown Prince may have said just that, and sincerely. There is a war clique in every European power, standing out as clearly and distinctly in relief from the mass of the people as any cameo stands out in bold relief from its supporting mass of onyx. The war clique carves its own destiny as accurately as the cameo is carved by an expert artist. We

are inclined to ask with the poet, "Lord! Exists there no one who can carry the truth to a ruler?" The rationale of the way in which members of the war party are given concepts will become clear if we pause for a moment to think of our own attitude toward officers. When we discuss topics of interest with them do we not politely and instinctively choose subjects for conversation which will be most interesting to them. I plead guilty to this myself. Instead of talking about agriculture with a general, I have usually drawn him out upon some subject about which he would talk best and that subject is germane to the question of defense. In all probability this is the common attitude assumed by the public toward members of the war party, and it leads according to good rules of psychology, towards fixing the impression that we are all chiefly interested in defense.

The Crown Prince of Germany is reported to have said that his people were forced to fight, because foes had drawn an iron ring about them. Every buffalo, porcupine and business man might say the same thing. Every chestnut, cactus and stipa grass might say the same thing. The plant world is popular for one reason, that it maintains armed peace while prepared for defense. The armed porcupine does not become aggressive unless some illness influences its brain. The idea that any one country in time of peace is singled out for united attack on the part of other countries belongs to the school girl, the obsessed officer and to the paranoiac. If a chestnut bur or a buffalo were to become impatient and start off aggressively because of enemies round about, then indeed would come united attack, and not until then. Men will not fully enjoy life until they get to a mature appreciation of the fact that life is a synonym for warfare. If men's intelligence then places warfare upon the basis of a fair football game much

of personal grieving will give way to a fine spirit of sport. Contest remaining nevertheless.

If I get Treitschke's idea aright he taught that the highest morality is service to the state and that it is not immoral for the diplomatist to be untruthful in the interest of the state. Our mentor distinguishes between that sort of lie and one told by the merchant in his own interest, the latter being immoral. Nothing can be more moral says Treitschke than the purpose of the state which is power. "When a state has a choice between the moral and the immoral it should naturally choose the moral, but it is often possible to obtain moral purposes only by immoral means, although not every purpose sanctifies immoral means." If Treitschke is correctly quoted one may fairly ask what particular purpose sanctifies immoral means. Perhaps it belongs to the side in which the soldiers are in a state of grace. Right there lies the fallacy in such teaching. The argument is brought to the man and that man a soldier, not a tax-paying merchant, nor even a priest who believes that the end justifies the means in the service of God. Truth and morality according to dynastic theory depend upon the decision of an individual in power, who may be full of wine or insane at the moment when he determines upon the ethical value of an act.

Wilde says that man is a clown with a broken heart, but the broken heart part relates largely to times of peace. During the progress of active warfare, jolly conversation at the officers' mess with its profanity and general character of sporty expression relates more to a polo game than to a funeral cortege. Soldiers do not sing the dignified songs of patriotism which have been written for them by poets at home, excepting when under orders from the unfeeling band master. Left to themselves the soldiers want nothing of the sort. They prefer silly songs of sentiment, and they play practical jokes upon each other in the trenches. When men of two opposite

sides are entrenched near together they often become friendly and by mutual agreement get out and play cards with each other and exchange tobacco or go to some neighboring farm house for hot water for tea. A photographer caught a snap shot of a wounded German soldier holding a cigarette in the mouth of a French soldier, both of whose arms had been broken. In some other part of the line at this very same time shelling may be under way, causing officers to gasp, gurgle, smell badly and go back to their original elements. All warfare is opera bouffe if we look at the matter in a large enough way.

Jesus entered voluntarily into warfare when he found money changers in the Temple, and I suppose there will always be money changers in the temple.

We love to think of the honor of any one country for two reasons. First, because we are idealists and in the second place because we are patriotic, but when we look toward Belgium, up looms rubber. When we think of England, up comes opium. Seeking for a breath of comfort in honor, we at last turn to the United States and there behold a spectre of four hundred broken treaties with the Indians, with the Canal Zone for capsheaf. All of this takes us straight back to Von Bernhardi. What shall we do about it? Why, keep on mighting, of course, but with an ever increasing tendency for intellectual might to become supreme over the barbarous physical might of all of us murderers.

Whenever the first commandment is broken at the beginning of a war, all of the other commandments unravel so rapidly that the Mosaic material is not fit for a skein to be used for civilization patterns again until the war wind stops blowing. Men revert to primitive instincts.

One compensation for the present war will be the temperance lesson given to the world by Russia, and committed to

memory by Russia herself. This will have a more tremendous influence upon civilization than any other single factor perhaps in the entire war. Further than that the whole moral character of Russia may have been changed by prohibition in the twinkling of an eye, as completely as the name of St. Petersburg was changed by an edict from the Czar. Russia may have burst forth upon her world destiny in this very act of annihilating her worst enemy. The Grand Duke Nicholas said to a group of army contractors, "He who steals I will hang." Perhaps Alexyeef and Tchelisheff, the vodka slayers, and Grand Duke Nicholas as thief slayer constitute a trident for arming a Jove of a state.

One reason why we assume that Russia is being held in reserve for development in the future is because arbitrary commercial stratification has kept the stupendous forces of that country separated,—not united in mass force. (The arbitrary bureaucratic rulers, the magnificent progressive scientists and intellectualists, and the peasant class with its enormous physical strength). Once these forces are united under a constitutional government Russia will rather easily dominate the world. Nature is not ready for this at the present time.

One reason why the expression of horror against the idea of another great war by arms is not effective, is because horrification and glorification are under way at the same moment simultaneously. The men who write and the men who fight constitute two separate and distinct groups. The horrification group appeals only to the tax payers who are already sufficiently horrified, while the glorification group which does very little writing attends strictly to its own business of making notes of all new advances in the way of armament and fortification.

The horrifiers and the warrifiers comprise those opposing forces that we find everywhere in organic life, giving indication of nature's plan and method. The horrifiers might succeed in disposing of warfare by arms excepting for two chief obstacles.

(1) The present generation will profit by experience and will not allow warrifiers to play their game for quite awhile, but the next generation will forget about the lessons of this war.

(2) The next generation will wish to take new theories of the warrifiers to the laboratory and try them out. Laboratory urge is one of the greatest natural forces perpetually at work within the minds of men.

She does not allow the ship of state to know that a little submarine is beneath it all of the while, intent upon trying out theories on the subject of explosives.

Excepting for the law of cultural limitations, marked by the twentieth century decline in birth rate, nothing but her own deliberate *"Selbstmord Versuch"* could have inhibited the rapid growth of Germany. Her industrial and intellectual expansion could be confined in no pent up Utica. Nature did not care to allow this at the present time and persuaded Germany to follow the example set by Saccharomyces in the cider barrel. It is said that the chief of staff withdrew his sabre in the presence of the Kaiser and said that he would rather commit suicide than see Germany commit suicide through not striking immediately at her enemies. No doubt other chiefs of staff in other countries were doing about the same sort of thing at the same time. Fear becomes an obsession on the part of sportsmen who play the game of arms. This is an ordinary psychological phenomenon. The tax payers expect a ruler to stand out against the obsession. If he is not gamester enough to do this the maledictions

of the entire civilized world fall upon the ruler who is first to yield to the importunities of obsessors.

Teachers and preachers have been particularly disappointing in relation to the 1914 War. Perhaps it was because we expected more from them. At the very first blow of that Great Hand which had come at an appointed hour for trimming back vain growth of nations, teacher and preacher quickly scurried under the cover of their financial protection in each country. From that point of vantage, singly and in mass, they sought vigorously to keep the world small-minded. Through a narrow crack came here and there a thin piping voice asking, "Have we lose faith?" Another thin voice has hesitatingly replied, "No! God is on our side." The bankers did more than any other one class to avert this war, and at one moment the socialists seemed ready to helpfully block the wheels of state that were running backward down-hill. The Christian Church did nothing to help. Great teachers whose mission is supposed to be the giving of correct information to the world did nothing to help. At the first sound of danger they ran back under cover. I am not one of those who believe that the only hope for this world lies in its being kept small-minded through the strenuous efforts of endowed teachers and preachers. At the present writing Germany is fighting tremendously well for what she believes, perhaps correctly, to be the cause of justice and right. The size of the indemnity which she probably must finally pay will be proportionate to the degree of her pluckiness and courage.

When the Great Hand has finished with its clipping and shearing, a new and more even growth will come in the development of associated nations.

So long as the present generation lives it will be practically impossible to persuade any German that the War of 1914 was not the result of concerted effort to crush out Germany.

So long as the present generation lasts it will be impossible perhaps to persuade any Englishman that the War of 1914 was not the result of Germany's believing the time to be favorable for bursting into Prussian eruption for a career of world domination. America will continue to believe that the Kaiser had it in his power to prevent the war from beginning in the year 1914 unless he had reached the limit of human endurance. The reason for this deep conviction on three sides lies in the fact that all three sides are probably quite correct in their premises. No teacher was great enough, however, to point out the fundamentals of the subject. Five minutes after the sound of the first gun was heard not one teacher or preacher remained with his head above the level of the ground of his own country in any of the warring countries. The question for teachers to expound is not what caused the war, but which particular country precipitated the war. That is the keystone theme,—the war itself was unavoidable. Who was to strike first? Had Russia struck first the whole world would have risen as one man against Russia. Had England struck first the whole world would have risen as one man against England. Wisdom under such circumstances consists in allowing the other party to strike first. The generals were obsessed. Wisdom and obsession are oil and water. Any country which first broke the First Commandment would have found that it had been walking in its sleep of obsession. It so happened that Germany awakened from its sleep-walking when it heard a loud bang at Liége: Grasping quickly for the helping hand of Italy it found that Italy was not present (because anticipated events were events of a dream). Looking for support in the pillars of England's neutrality Germany found that she had been playing Samson to the pillars of England. She awoke to find that Turkey would have to be bribed before allowing itself to be injured. She awoke to

find that Japan would grasp the Allies with one hand in order to swing the other hand over a pot of gold in China. Germany awoke to find that Russia's internal revolts were like Austrian and British and Servian and other internal revolts,—nothing more than quarrels between man and wife. Had Russia walking in an obsession dream struck first, then Russia in the same way would have been rudely awakened by a concert of bangs from Germany, Austria, Italy, Bulgaria, Turkey, Japan, China, Poland and Finland. The lessons of the 1914 War will not be forgotten by people of the present generation, but they will be forgotten by people of the next generation.

Vessels carrying loads of material for the relief of sufferers from the war cross the ocean at the same time with vessels carrying loads of ammunition. This apparent inconsistency belongs logically to the bankruptcy of social methods in government otherwise known as "warfare by arms."

The tongue to tongue conflict that is now going on between German sympathizers and sympathizers with the allies means very little and will lead to no conclusions of importance. No one seems to stop long enough to realize that a dozen thousand nations are still to come upon this Earth. Every civilized man is about half right in his views of affairs of this World and he hopes and believes that others will come to his points of view later. The only trouble rests in the fact that the men who hold these hopes are upon opposite sides of questions.

Among the dozen thousand nations which are to come and let their people sit upon the same rocks upon which we now sit, there will be some very odd and peculiar nations much more odd and peculiar than any which are at present engaged in the European war. These new people are to have odd and peculiar methods of warfare,—judged from our present viewpoint. We do not know of what these methods will consist. All we know is that the present European war is a small

incidental passing affair which makes a great many people uncomfortable. The battlers in this war will fight in all probability to their last resources, because very strong varietal hybrid protoplasmic types are engaged, and with equipments of a high degree of development, rather evenly matched on both sides.

We might assume that a long series of wars would shortly follow the present upheavel were it not for the fact that all leading European nations excepting Russia are now running out of protoplasmic energy rather rapidly.

We shall probably have to await the development of other strong groups of varietal hybrids before another vast general war develops.

Finally! Warfare as an essential feature of nature's plans belongs to the philosophy of one side of the subject only. We are not to understand that everything is engaged in destructive effort against everything else. Darwin's doctrine of mutual dependence of one form of life upon another form of life is quite as far reaching in its range and conclusions. These two opposing forces (of struggle and of mutual dependence), are the two opposing forces which we observe everywhere in nature. The mutual dependence doctrine is one that I would teach in place of Treitschke's right-might, when we come to the question of prognostication concerning human destiny in the higher reaches of intellectual evolution of man as moral agent (if we may employ that metaphysical expression).

To-morrow's nations, in advance of our semi-domesticated nations of the twentieth century, will develop and apply the mutual dependence doctrine in the sunshine of the brotherhood of man idea.

Darwin's doctrine of mutual helpfulness, together with the sap-channel concept of Dr. Butler's "international mind," seem to me to furnish two brand new vistas looking out of the dark

and tangled jungles of warfare. Woman is now to repair the damage done by the general.

A woman's fear of suffering in child bearing is often a morbid fear—thought of the double rose—and is sometimes made a morbid theme by the clergy. Nurses at the maternity hospital laugh at the idea, and are ready to bear children of their own without fear. They know to be sure that accidents may happen, and that serious suffering really may occur, but chiefly from unskilled management of abnormal patients. Taking cases as they run by the hundreds at maternity hospitals, and as the nurses see them, they fail to impress the good women of the nursing staff with fear about having children of their own. I have often noted that married women who had served as nurses on the staff of maternity hospitals approached the subject of their own child bearing with no apprehension whatsoever. They simply made arrangements, and let it go at that. Their attitude was based upon knowledge coming from large experience.

The most contemptuous look I have ever seen come over a woman's face,—a look that lingers in memory to this day, although the incident occurred more than thirty years ago,—followed what was intended for a compliment. A big, hearty, awkward Irishman, recently landed, was taken into the employ of my friend J. We were standing together in a little group. "Mike," he said, "this is my new wife." "Oh, indade! She looks the foine breeder," said Mike, bashfully and respectfully.

Figures may be very misleading unless one knows collateral facts. Dr. Hamilton recently pointed out after investigation of 1600 families in Chicago that in families of four children the death-rate was one hundred and eighteen in a thousand;—in families of eight children, two hundred and ninety-one

per thousand. The first deduction which we are apt to make applies cause and effect to the relationship of figures. As a matter of fact, the sort of people who have eight children are apt to be the ones who do not employ the best doctors. The sort of people who have four children are apt to have better doctors. In families where the average is only one or two children, such skilful physicians are apt to be employed that these one or two children, commonly defective, are carried to adult life, and increase the proportion of double roses. Our second deduction then takes us to a question of the kind of medical service received by different kinds of people.

I asked my friend Dr. Knopf, the expert in tuberculosis, to throw some light on the seeming inconsistency of there being few children in tuberculosis colonies, although about the normal proportion of children is found among the tuberculous poor. The substance of his answer is about as follows:

"In animal experimentation tuberculosis brings about a tendency to sterility, but this is not borne out clinically in the human race in the same way. In a certain proportion of cases no doubt, we have a tendency toward sterility as in the lower animals; but an explanation of the fact that tuberculous permanent colonies have few children belongs to a psychic feature in part. The people at the permanent colonies are of a much more intelligent type than the tuberculous poor of the cities. They know that tuberculosis in parents predisposes the child to the disease by reason of inherited weakness,—what one may call 'Physiological poverty.' They also know the danger of post-natal infection, that even with the greatest care the child of tuberculous parents is quite apt to take the infection. People in tuberculous colonies also know the social aspect of the disease, and have learned by experience that it

is costly, and the larger the family the less care and the less good food can be provided, unless a family is particularly well-to-do. Among the ignorant tuberculous, the birth-rate seems to be about as large as among the non-tuberculous people."

The biometrists consider it a curious discovery of theirs that the parents of families of six children are proved by statistics to live longer than parents whose children number less or more than six. There is nothing of complexity, puzzle or mystery in this for the biologist. He at once concludes that if six children represent the longest lived parents under normal conditions in a given race, that is the normal complement of children for any nest in a given race of *Homo sapiens*. A woodcock normally lays four eggs. If we find in the nest six eggs or only two eggs, we consider there may be something the matter with that particular pair of woodcock. If the biometrists make a study of parents of the single child we shall probably be surprised at learning of their relatively short-lived parents, and parents requiring the services of doctors most of the time for their illnesses. The life insurance companies undoubtedly have material for statistics upon this point already, if they wish to put them together for us. The biometrists tell us also of their surprise in the field of primogeniture at discovering that the eldest son is not the one best equipped for managing the fortune of a family. The biologist could have informed the biometrist that the eldest son may represent relative immaturity on the part of the parents, or what is more important, that he may have been born at a time when the struggle of young people to maintain an economic equilibrium made too much impression upon the unborn child. The eldest son is apt to receive an excessive degree of attention, and that fact, together with the future more or less assured during the character forming period,

would have the well-known tendency to lessen his training in self-reliance, and would lessen his degree of enterprise.

Brill, in the *New York State Journal of Medicine,* for August, 1912, analyzes 372 cases (172 men and 200 women) of "only-child" in his practice. The ages ran from eighteen to sixty-eight years. The predominant feature in about 33 per cent. was abnormal sexual life. About 18 per cent. suffered from various types of dementia præcox, and the rest had different forms of psychoneuroses. The confusional insanities belong to the toxic group, but these were not specified in his list, which presumably contained some cases of the confusional insanities. There are no statistics to show the proportion of normal to abnormal children among only-children in general, whom we may specify by using the old English form of the word "onely" as a noun, but the normal ones should naturally be in small proportion. The many peculiarities of onelies are due in part to disproportionate protection, and to concentration of attention of the child upon itself, to the point of developing excessive egotism. Brill states that the majority of onelies do not marry at all, and of his list of 372 cases of an average age of thirty-four years, only 93 had married. It is best for the individual that there should be no onely, because of the attention and protection which as a rule badly prepare him for adaptation to the affairs of the world. It is best for the nation to have few onelies, because they represent so largely a group with sensitized protoplasm and imperfect cell construction and maintenance. Even the ones who are not injured in training by pampering and coddling do not have quite an even chance with other children in getting normal positions in the social fabric. The onely is largely a product of cultural development in high degree, with to be sure a certain number of exceptions belonging to unavoidable accident, on the part of parents.

The tremendous potentiality and the splendid efficiency of many people who have no children, or only one child, is due to the very fact of their representing the cumulative effect of culture when the rose doubles. A single child himself is apt to be of very high development, or very defective.

In considering the question of those who have no children or only one child, we must bear in mind the instances in which it is not due to any intention or even to any illness, but is due to some accident. These instances are so few, comparatively, that they serve only as safety valves for escape of feeling on the subject. Without knowledge of the nature of an accident, it must be assumed that people without children have reached cultural limitations and are simply ending their family lineage in response to that innate message delivered by nature.

There will be more selfishness displayed in the world as the proportion of single children increases.

The lessened number of marriages occurring with the single child system is one of nature's ways for preventing over-population. When the parents of a child which has received concentrated attention note any danger of appearance of the love psychosis, a warning cluck is given. This may mean little more than a preliminary caution, but it suffices, and is effective in turning a child away from the psychosis. If marriage really does occur in cases of the single child, the father-in-law or the mother-in-law is prone to be troublesome. One of the justices of a Chicago court has stated that one-half of the divorces in his experience are from interference of mothers-in-law. (Other statistics from tabulated reports make this cause less frequent.) He makes no report on the proportion in which the single child figures. The mother has made such intimate study of her only child and knows so well what seems to be needed in a husband or a wife that she brooks no over-sight on the part of the son or daughter-in-law. At the same

time she has commonly transferred the most active part of her love from her husband to her child, so when the child marries it becomes a sort of divorce from the one she loves most. Under conditions of modern life, and struggle for position, father and mother develop the intellectual side in relations toward each other to such an extent that the economic comes into conflict with the esthetic in their love. Very deep regard and love may still remain between them, but it is not fancy-free. A parent therefore transfers fancy-free love to the child, that deep love which under less strenuous conditions in life parents would give to each other. Furthermore, the single child representing high culture and training, is apt not only to have its talents developed to a high degree, but at the same time any abnormalities belonging to the doubling process in flowers are apt to appear. The single child will occur more and more frequently however, as the world progresses, and the best of them will represent the best mental qualities of the race, although they hasten the physical ending of a nation.

Jealousy is at the bottom of a mother's antagonism against the son's intended wife, jealousy against allowing another woman to share her son's love. The father does not often stand in the same relation to the daughter, because of his natural characteristics. The unconscious love and feeling of protection that a mother has toward her son, no matter what his age, even at seventy when she is ninety, plays a tremendous part in shaping her psychology, and it works out in opposition to any thought of marriage for her son. That is another reason why, when we get toward the one-child system in the course of decline, population will diminish still more rapidly. The mother who has several daughters places no such obstacle in their way as does a mother who has but one daughter.

The only child is usually kept from marrying by his or

her parents, who unconsciously begin critical analysis of an admirer at a time when very little water suffices to put out a tiny flame. This is rather effective in eliminating the only child from the marriage field. Other parents do the same thing, but not so persistently.

The most dutiful children are also among the ones chosen by nature for elimination in order to prevent too rapid progress. Their respect and love for their parents is such that they listen instantly to the first criticism coming from parents who are solicitous about prospective lovers, and the most dutiful children therefore turn away most quickly before the love psychosis takes charge.

There are thousands of dutiful sons and daughters unmarried because they are so dutiful as to accept thoughtless comments of solicitous parents whenever suitors appear. Many young women have been turned away from marriage because they were such good daughters; many a son because he was such a good son. This seems to be in nature's plan for preventing too rapid development of the race. The goodness of a son may become morbid when he is dominated by a capricious mother, after reaching adult life.

I have known grand old maids and grand old bachelors who remained unmarried because of some noble or heroic reason,—an unavoidable accident, perhaps. These are not the ones upon whom nature has planned to depend for avoiding over-population. The far advanced double roses are the ones who make up the majority of the unmarried.

We commonly hear it said when a young woman is unmarried, that no one is good enough for her. Often enough it is really difficult to find some one good enough for her. She is very apt to represent the last of the family,—and cumulative good qualities. The same is true of men.

In all of the old towns of the Eastern states we find quiet

people, refined to the last degree, who have not felt instinctive urge to marry. They are delightful socially and represent all that is best of our civilization, but I always have a feeling of regret when realizing that these are the refined ends of families, instructed by nature to stop breeding because cultural limitation has been reached.

It is nature's plan with bees to make the useful workers sexless, and this condition is approached in man when decadence begins. When the germ cells undergo variant changes, we sometimes note compensation in nature's balance. There is a checking of too rapid progress of the people who present doubling rose effects. Decadent popular writers appeal more strongly to those people who themselves have variant doubling of their germ cells. The scientific writers appeal more strongly to people who have variant doubling of the soma cells. In this way the balance of nature is preserved, matching destructive literature against constructive literature, with the latter slowly winning in the races of people marked by nature for long survival. In proportion to the retrogression of a people we find popularity of germ cell doublers in literature. In proportion to the progression of a people we find popularity of soma cell doublers in literature.

Nature plans that destructive germ cell doublers, and constructive soma cell doublers shall not understand the work of each other,—for in that case nature's plans would be revealed, and almost any nation might at once ascend to a position that would be too far advanced for the times. Nature holds it best to allow each group of writers to believe their respective fields of observation in the world to be the most obviously important. She does this in order to prevent the oak tree from growing eighty feet in height in one day. Civilization will continue like the growth of an oak, slowly and surely, with rings to record its cycles of activity and of rest.

Sex of offspring is determined by the action of chromosomes in sex cell nuclei. Action of the chromosomes depends upon the influence of chromatin substance which conducts hereditary transmission of qualities, and determines the mechanism by which these chromosomes give rise to hereditary characters. Under normal conditions sex characteristics are transmitted normally, but if the chemical stimulants of the chromosomes happen to be abnormal through some such cause as deficient oxidation, or because of the advent of toxins of microbic origin, the characteristics of progeny may show interference which is demonstrated in males having female characteristics, or in females having male characteristics. This is my present idea, and speculative, but it would seem to be upon a tenable basis. The higher cultivation which neglects oxidation of cell protoplasm, or which allows of microbic toxic interference with action of chromosomes of sex cells, could account for the loss of normal sex characteristics in plants (double flower) and in animals (viraginity) which is observed in decadent stages of progeny. "Back to the land!" means then essentially, "Back to oxygen!" Perhaps also it means "Back to light for photosynthesis in the human species!" When men take on the characteristics of women, they may show an extremely high degree of efficiency in fields naturally belonging to women. When women take on characteristics of men they may show an extremely high degree of efficiency in fields naturally belonging to men. Sex cells having been subjected to interference in the course of development, the tendency is for the most highly cultivated men who are like women, or women who are like men, to remain unmarried, or, if married, to have no children. Breeding instinct with them may become repulsion in feeling, while sex instinct may appear actively in variant form.

When the internal secretion of sex cell organs is lessened

or stopped through accident, disease, or arrested development, an individual loses some of the characteristics of its respective sex and may develop at the same time certain characteristics of the opposite sex. We do not always find an exhibition by one sex of the very best qualities of the other. We are more apt to find an exhibition by each sex of undesirable qualities of the other. This is a logical sequence, and should be anticipated from our knowledge of the features of decline in various forms of organic life.

In Nicholson's British Encyclopedia, published in 1818, an article relating to shooting, records the observation that after a certain age the hen-pheasant sometimes becomes barren and assumes the plumage of the male (protoplasmic variation in sex cells). In this state she is subject to the jealousy of other males and has an unnatural bent toward destruction of whatever eggs of her species she can find. In cases of viraginity or of effeminacy in *Homo sapiens*, we often find, as in the changed hen-pheasant, a mind that is inimical toward children. Psychologists like to inform us that features of viraginity or effeminacy are due chiefly to a direction of the psyche in response to influences of environment. I imagine that the psyche of a hen-pheasant must be rather powerful if it can actually change the length of her tail feathers, when she assumes the plumage of the male.

In cases of viraginity—a birth accident similar to effeminacy—women take up men's occupations naturally. This physical state actually occurs in a fairly large percentage of women who take up business and the professions. The viragints will argue very properly from their viewpoint that women are under no obligation to furnish children, and in fact these mutants themselves should not do so. This will give the world only their brilliant mental features which we may utilize, and it will avert an increase in the pro-

portion of badly defective children. The cultivated woman of good health and masterly skill in affairs, but without children, may be of inestimable value to the state, and yet, with four sons her value might be quadrupled. Her position would be that of a general who outlines a campaign and leaves all details to his officers. A woman with four officers trained to her ways of thinking may accomplish for the world four times what her personal unaided capacity would suffice for accomplishing.

Viragints and effeminate men as mutants, divagating from the mean type, should not be called upon to take a part in propagation of the race. The exceptionally brilliant minds of these people can often be put to good use in a world which needs all of the minds that can be developed, but they should not transmit their decadent physical side to progeny.

As the sexes approach each other in type under conditions of peace in a country, it frequently happens that girls of a family are more efficient and more ambitious than the boys, but they are apt to lack sufficient strength to carry out their ambitions. It is not the fault of the children, but is due to entailment of characteristics by progenitors.

As the sexes approach each other in type in the course of degeneration of a nation, there is a flying apart,—a bifurcation within the ranks of the divagates of each sex as it is torn asunder,—one arm of each bifurcation showing characteristics belonging to the opposite sex. The other arm represents exaggeration of characteristics belonging to its respective sex, together with diminution of the normal proportion of average characteristics. Among women we find on one arm of the bifurcation an approach to the masculine in physical characteristics, and a tendency to high development of the intellectual set of faculties. These women may engage in extremely useful activities; in fact they are prone to be more

active perhaps than men in the lesser civic utilities. Very brilliant and clear minds are found among these women in business and in the professions. They do not understand very well what is meant when the subject of motherhood is under discussion, as it is not within the range of their instinctive response. Members of this group who most nearly approach the masculine type in mind are quite repelled by the idea of motherhood, while others sometimes have it in a transitory wish for children, which passes out of mind for weeks or months at a time. They tell me that the desire for children is sometimes almost overpowering for an hour or two, and then passes away like the sudden flare of light among dying embers. Along the other arm of bifurcation among women there is exaggeration of characteristics of the feminine figure, and abnormal heightening of the characteristic feminine play of emotions. These women are less useful than either men or women of exemplar type, having little desire to engage in any activity aside from that of personal display.

We find many fairly accomplished actresses in this second group, but not the ones who work indefatigably at developing valuable and exceptional histrionic talent or genius. We find in this group chiefly the sort of women who step right straight forth from a fashion plate. Type individuals of this group excel in appealing to the passing emotions in men. They become expensive but unsatisfactory playthings for men. Sometimes a plaything bifurcate will have nine suitors, each one evincing early signs of the love psychosis. The one whom she prudently chooses in the end may soon wish heartily that the other eight had won, for he finds that at least eight would be required for keeping her fully pleased with life. Some one of the eight who lost her may likely enough become an anachronistic misogynist.

The plaything bifurcate usually marries. Being emotional,

there is often much sentiment mixed with her motives, although she is pretty sure to "marry well," realizing economic necessities that go with exhibition, particularly when she has ambitions artistic. Misunderstanding soon begins, and after that her husband is looked upon as a bore, but one of the necessary things to be endured if possible. So long as the husband is attentive she may be rather good to him,—in exchange for considerations various and sundry, but should he carelessly devote too much thought to his business affairs, trouble begins promptly. Her friends are informed confidentially that she would never marry again, because one dose is sufficient. In the event of divorce, or loss of her husband by death, she commonly does marry again without much loss of time. She knows how to attract, and is not so scrupulous in demeanor when attracting as the mother type of woman would be. The latter instinctively protects herself against all influences that would be detrimental to race preservation, incidentally including questions of social stability. The instinct of motherhood in bifurcates of the plaything group is often lost wholly, but sometimes flares up intensely for brief moments. Some of the victims tell me that the thought of motherhood is repulsive at all times, and discussion of the race suicide question with them only causes unpleasant sensation, without leading to a psyche which would change their attitude.

Neither the serious bifurcate nor those of the plaything type carry an attitude suggestive of "mother" in their mental or physical bearing or habits of dress, unless it be in the wearing of plumage of a mother bird in their hats. When speaking for women, they are no more representative of that sex than are so many workers among the honey bees. Like the workers in a hive, the serious bifurcate may store up very much that is necessary for the welfare of the colony. It is possibly a plan in nature to have man gradually become like the honey

bee in the respect of having asexual workers to carry on the bulk of daily activities of the race. The first thought which comes to mind in opposition to such a view is the fact of the tendency of the two sexes to adopt undesirable characteristics of each other when making exchange. "Undesirable," however, is a word which relates only to our present understanding of what seems to be desirable.

An alarmed English writer describes as future mothers of the people the women who are devoting themselves to bridge gambling, with smoking and drinking, and to risky amusements. He is fallacious in his premises. These are not the future mothers to any dangerous extent. They are Elims on the way to the bonfire. The future mothers are fine women with established instincts of right living—nature's aristocrats. Their numbers are not growing less. These future mothers are not written about, any more than we write about the commerce of Broadway. Let a fire break out on Broadway, however, and it lights up oratory and press notices. Time wasters and morality wasters among women receive attention in the same way. Anything so commonplace as the regular business of a metropolis does not capture the imagination of novelists, short story genii, and other exceptional people. Anything so commonplace as an educated mother training her children in civic duties and in home duties possesses no more of startling, burning, neurotic interest than does the commerce of Broadway, yet this is the real future mother in America, England, Germany, France, or any other civilized or uncivilized country.

We must not lose sight of the fact that the greater number of women in every country are good comfortable sensible normal mothers, not the least bit interested in hectic questions of what are we coming to. Double roses on their way to elimination are more insistent upon self exhibition, and therefore disproportionately in evidence.

When sex is being torn asunder in men, by the violence of nature's insistence upon maintaining sex in the presence of a conflicting demand for limiting population, we note as among women, a bifurcation among the divagates. On one arm of this bifurcation we find men who devote their whole thought to sports, from prize fighting to yachting, as soon as they are able to do so financially. They show an exaggeration of physical characteristics of men, but higher mental characteristics are held in abeyance. There is a tendency for them to be reactionary in politics and to have little interest in science or the humanities. The instinct of fatherhood in their minds is not associated with their facile response to feminine attractions, and they choose the plaything group of women for companions.

On the other arm of the bifurcation in men we have the exquisite dilettante, as well as men with even creative minds, capable of expressing the deep and full play of the feminine kind of emotions. This group of men is also prone to be reactionary in politics, which characteristic, curiously enough, seems to belong to both branches of the bifurcation in cultural over-development of men. The persistently progressive element, decade after decade, is found among men who, as with women, really constitute the comfortable majority in a community, although spasmodic progress is sometimes made forcibly by the emotional groups.

Men and women who are bifurcates say that the expense of bringing up children properly is so great that few are wanted. We may reply by calling attention to the clergyman of small salary with six children, and with two poor relatives living in the house,—imposing upon his charitable nature. The bifurcates answer that these children do not have the best advantages. "We want our children to have such opportunities as they ought to have. We would rather deprive

ourselves of their delightful presence than to make them suffer hardships." Many of these people "who cannot afford to have children" are looked upon as plutocrats when they visit a poor relative in the country who has five children and four dogs, and what is more, the five children of this poor relative are likely to furnish that well-oxidized stock from which the best town talent is ever recruited.

This insidious mental control of over-population is one of the delusions which represents the working of natural law. Men who are accustomed to struggle and to get hard knocks are the only ones chosen by a football captain for his team. He does not put upon his team the men who have been expensively protected. There are no men upon his team who arise and whine about this being a hard world, a vale of tears, when they get knocked down and bruised. He chooses rather the men who are in danger of getting out of bed too soon after their legs and arms have been broken. A high degree of education and of culture without struggle tends to produce the reactionary among men in affairs of state. When the bifurcate feels an instinctive tendency to allow the family to come to a condition of rest, there is at the same time an instinctive wish for the state to become quiescent. A high degree of culture then goes hand in hand with reaction in politics among men, and ends logically with elimination of family and of state. We may speak of the two arms of bifurcation of each sex as divagations from the exemplar or normal type of that sex. The men of both divagations have a tendency to join the reactionary group in politics. Only one divagating branch among women (comprising the ones who approach the masculine type) wishes to take charge of the state and to adjust its affairs progressively to the order of fine housekeeping. This is commendable ambition. The other divagating branch among women has no interest in

affairs of the state. Transitory affairs of the heart require too much time.

There are reactionaries and progressives in the exemplar centre of the public, quite as well as among the bifurcates. The reason why this seemingly unnecessary statement is made is because a reader of the notes has just asked me to which branch he belongs. He belongs to neither one. An attempt was made at classifying certain exceptional people who are much in evidence these days. It is recognition of and classification of these exceptional people that is needed. The effeminate among men are apt to have little interest, one way or the other, in politics. Viragints among women are inclined to have a very marked interest in politics.

The reactionary divagate among men comes into conflict with the abnormally progressive divagate among women. This explains what seems to be the senseless action of the rumpus group among militant suffragettes in conflict with reactionary statesmen. It is really a case of two decadent wings of the army firing against each other, and impeding the progress of the main army.

The fashion plate and plaything group of women divagates makes no direct interference with progress of the state, but represents negative pressure. Members of this group limit population by having few or no children, and their influence is toward elimination of the family and state in that way.

Kipling with a fulminating flash of detonating scorn rips and reduces the plaything divagate down to "a rag, a bone, and a hank of hair." Nothing in poetry can be more tremendous than his vampire, and yet from our point of view the vampire herself is to be pitied. Poetry would make her a compensating force to be used against that of the gray-hawk man, and this is probably a true cleavage line for the poetic movement. Yet from a scientific point of view, the plaything

divagate needs our sympathy rather than our scorn. She is unconsciously playing a part in nature for which she was fated. Her life is not a happy one. She is not gaining any reward in this world, and according to theological authorities is to have none in the next. Why then should scientists not extend to her a measure of sweet pity, although the poets, stirred into action by each other, flash equilibrating discharges back and forth between her and the gray-hawk man.

Poetry paints what science draws. Painting that is out of drawing serves only to stir those emotions which are wasted unless followed by some appropriate act for which they were phylogenetically intended. The vampire and the gray-hawk man, outlined and shaded by science, colored by art and by letters, represent after all nothing but the playing of exceptional individuals by the wayside as we all go sliding unconsciously toward that immutable infinity which the pagans called destiny. Exemplars are not to be distressed when divagates—either poets or scientists—are throwing at each other the half-truths chosen for purposes of argument, and which have sharp edges, being half-truths. Let us all laugh merrily with life joy as we glide along with the escalator of evolution.

Among straws of decadence showing direction of the mind at the present time we note in college theatrical troupes an increase of masquerading of sexes, men taking more and more the part of women and women taking the part of men. This is simple fun with some, but largely in line with abnormal inclination of others, as every one knows who is in a position to hear the undercurrent of conversation,—and as every one knows who is familiar with the psychology of professional impersonators of the opposite sex.

If many of the bifurcates are unhappy, it is not their fault, poor things. They simply represent the cruel sport of nature in

its elimination game. It is chiefly the divagation group that finds itself sympathetically interested in the strenuous drama, or in the problem play at the theatre, not realizing that such plays are made for divagates by divagates. They furnish "burning questions" which do not appeal the least bit to the comfortable and natural majority, excepting perhaps as one is amused when watching a cage of disturbed monkeys.

The safe keel of society is the substantial majority in any yacht of state. Sex divagates are the spars carrying racing sails of the emotions, or reactionary sails too close hauled for headway. The safety of sailing of any nation will depend upon the relative proportion of sail area to keel balance.

One does not always promptly recognize the views belonging to viraginity or of effeminacy, as such. The anatomist can always tell the sociologist a few basic facts upon which his judgment in this matter may be placed. The pragmaphobe on reading this statement will quietly and silently steal away to some suitable place, and then begin to bark loudly at me. In the monistic unity state the pragmaphile will just as silently go up to any subject, silently grasp it, and manage it without any barking at all. The safest laws for the state come from the anatomically normal breeder. The best art and literature of the state come from the anatomically normal breeder.

In the *Buffalo Medical Journal* for July, 1912, Dr. Parker gives statistics concerning the physical condition of women during college life, and the statistics would seem to indicate that a fairly large proportion represent such evidence of decadent anatomy that they might better be employed in some out-of-door occupation. The report, so far as this point is concerned, may be misleading, however, because the same number of girls from the factory might show a similar proportion of decadent anatomical features. Statistics recently col-

lected relating to the child bearing of women from a number of co-educational institutions showed that not one class had reproduced itself in numbers at the end of a decade from graduation.

College women at co-educational institutions excel in high marks. They are inclined to disregard health rules in order to satisfy their ambition in competition with men.

One reason why women as a rule are more nervous than men is because they oxidize their toxins less, not taking so much physical exercise. This comparative failure to oxidize toxins means comparatively more highly sensitized protoplasm in consequence.

Pedagogy as the second science in importance will some day allow women to go back easily to the home again, where they can serve the state as cleverly and usefully as men serve. "Career" for a woman is calamity for the family, although of much temporary value for cultivated society in many instances.

Women when seeking a "career" are apt to be in a state of ungodly unrest, turning first to this idea, then to another one, very earnest indeed but dissatisfied generally. Sometimes they enter a field of work which leads to great success, but even then they remind one of a beautiful trout which has been thrown out of the water and is fluttering among the hellebores and violets on the bank of the brook,—making exertion which is out of proportion to progress.

Some women are capable of the highest degree of deliberative procedure, but a bit of verse is either apt or inapt for certain ones amongst their acquaintances.

"O the gladness of a woman when she's glad!
And the sadness of a woman when she's sad!
But the gladness of her gladness and the sadness of her sadness
Do not equal half her madness when she's mad."

As a matter of fact, when a man speaks of women or a woman speaks of men, we must remember that each has in mind a composite picture of the sort of women or the sort of men that he or she has attracted about himself or herself, on a basis of personal characteristics of the individual who is speaking.

If women are to settle great social questions, we naturally look for object lessons in their treatment of questions nearest to them. The servant question, for instance, belongs peculiarly to women. For a long time they have been quite free to apply wisdom and executive ability in the line of this, their greatest problem of the day. When women physicians insist upon securing hospital positions and breaking into established custom with disarrangement of system of the institutions, we ask if it would not be better for them to develop their own great hospitals. The staff of every hospital is a sort of social club. That at least is the situation to-day with the hospitals built by men, and with most other institutions built by men. Each successful institution is well managed for the reason that club spirit prevails among all of the officials and responsible employees. The club idea is essential as a social phenomenon in the interest of united effort in work. If women are admitted to the social clubs of men because of their unquestioned and genuine value as individuals, these clubs will then lose their character. The same statement applies to practically any institution built by men. We wish to see equally great institutions built and conducted by women as a result of their united fraternal effective efforts.

It is chiefly when the woman's career is shaped toward the idea of becoming a wife and mother that the furrows leave her forehead and the fists stop clenching. Then comes an air of peace and calm and of satisfaction in life, which I do not seem to observe among even the most ambitious and successful

women who have put aside the idea of this chief career. A woman may have a most valuable and important occupation aside from the career of wifehood and motherhood, but it is important to distinguish between "career" and "occupation."

On one occasion a very energetic and successful woman in our profession happened to be ill, and while I was in attendance and discussing various subjects the question of independence for women came up. She laid her hand upon mine and said: "Doctor, do you know I do not want to be independent. I would rather have someone to love me and pull my hair when I deserve it." Goodness! thought I, what if Miss K. and Miss L. were to hear that! Not very long afterward I quoted the remark to Miss K. Said she: "Don't tell anybody, don't quote me as saying it, but Dr. E. is perfectly right!" Not long after that, I was mischievous enough to make the quotation to Miss L., who became very indignant. Said she: "You are not letting out any secret. Dr. E. is one of those women who are traitors to their sex, our heaviest load to carry when we are trying to make progress."

In the present century we are no doubt to make a better classification of women and allow those who wish to get home to do so freely. It is after all a matter of the individual. The ones who prefer to enter into business competition with men, and to see an enemy in the face of every man whom they meet are welcome to that satisfaction, if satisfaction it is.

I do not mean by this that women will be chained to the home. They will be more free to go into activities and return to the home, but the latter will furnish the career. The steps in progress which we note are these: Primitively, nature chained women to the home for fear they might soar away before wisdom had developed to a sufficient degree for showing them their fundamental importance to the state. Later, when the chains were loosened by civilization, they had a tendency to fly

too far away from home in their new freedom. Now, under the influence of advanced pedagogy, those who are not divagates will return to the home, free to come and go as they please, but recognizing the home of the family as home of the state.

A good deal of unnecessary discussion is taking place over the question if school teachers should be mothers or spinsters. The whole test, as a matter of fact, should be a question of efficiency. The nucleus for argument from the two sides is correct. People who have no great diversion, like celibate priests, may devote themselves more assiduously to their work than other folks who have some great diversion. A fallacy appears when the assumption is made that spinster teachers are in that fact free from diversion of interest. On the other side of the question, a mother is experienced in ways of special knowledge and sympathy for childhood. Further than that, the temperament which includes the idea of motherhood naturally extends to encompass all children within its range of action. I do not know of any salient fallacy in connection with this question; there seems to be only the definite objection that a mother is already fully occupied. The question of efficiency as mother and teacher relates chiefly to the matter of expediency in division of time. A spinster with mother instinct and no great diverting interest is the ideal teacher for the young on the whole.

The history of incessant warfare in Great Britain in mediæval times might be continued even up to the present day, excepting that internal political warfare now satisfies the desire for contest fairly well, and in the course of progress has superseded killing during longer and longer intervals. The sex warfare for political rights of women is only a part of the general history of warfare of Great Britain, and quite likely belongs to progress. Benefit for the race is likely to

follow from the woman's movement in so far as a higher degree of culture is attained, even though the means be as violent as the means of earlier wars. Breeding will lessen, however, as a higher degree of culture is reached, and Great Britain, more perfect from the cultural standpoint, will gradually decline and become obsolete like other nations when protoplasmic limitations are reached.

The increase of bacteria is enormous, of mice less, of men still less. As species ascend in development smaller groups of individuals are intended to be spared. All races of bacteria, mice and men, reach cultural limitations and their protoplasm becomes senescent.

If we are asked about the future of the United States, we may point to the birth rate and the drama. These two water gages indicate what is in the boiler of any country. Reasoning based upon protoplasmic history indicates that Puritan, Cavalier and Dutch established very durable mean type hybrids of excellent character; first rate material for government under democracy, but material which would be revolutionary under arbitrary government. There is some question if the fund of protoplasmic energy of these types is to be as durable on our soil as it may be elsewhere. This question is brought up because we observe that other organic forms,—trees, for instance, live under conditions of rather more nervous tension in this country than they do in Europe or in Asia. We have comparatively few species of trees which live to a great age, the most notable exceptions being trees which do not belong to this era at all, but which for some reason ran past enemies and came down to us from ancient times.

In olden times, which means ten years or so ago, life was held to mean the entrance of the "vital principle" into an organism. We now know from laboratory experiments with

the sea urchin, nereids, and some molluscs at least, that what we call life begins with acceleration of the rate of oxidation of the egg,—a single cell. Life ceases with the cessation of oxidation of the great group of single cells, composing the body of an animal. The beginning and ending of life have been placed upon a physico-chemical basis in the laboratory. The experiments of Loeb and his followers show in laboratory work that the egg is the essential bearer of heredity,—and that confirms the stock farm experience which has been arbitrarily recorded. Proceeding to reason from this point, the woman is the one whose physical health should be better than that of the man, instead of worse as at present. A chief effort of the chosen nation will probably be toward securing a high class physical condition in women. The instinct of men has always been to protect women, and this has represented a primordial instinct. It has not as yet extended beyond instinct, to become a matter of reason, with formulation of plans for securing protection of the nation through development of the finest health in women. That belongs to a higher degree of culture of the sort that is coming. Our civilized protection of women, following instinct rather than reason, has worked out destructively. Women have done just what men would have done when relieved from the necessity for physical labor, *i. e.*, reclined and declined.

Nothing is more clear than the evidence of primordial law, but it may go entirely wrong in effect when applied to artificial conditions.

The healthy mother in response to this law loves her child more than she loves her father, mother, brother, or husband,—even as she was loved by her own mother. Responding to a primordial law men save women first at the time of an accident. All growing nations show extreme gallantry toward women, according to primordial authority. A measure of the

progressive spirit of any country can be taken from an index as expressed in the custom of saving women first in time of accident or danger.

Gallantry is most marked in localities where increase in population seems to be most desirable. We find more of it in a western mining camp than in a crowded city. This seems paradoxical when we consider the general lawlessness of a mining camp, but it demonstrates the primordial nature of gallantry. When a woman declares herself as one worthy of respect in the mining camp, the men may shoot each other in order to protect her from even the semblance of danger. This is not done in the city.

Among soldiers, sailors, lumberjacks, miners, and others far removed from feminine influence, where conversation is often profane and obscene to the last degree, I have seen so much of courage, good-fellowship and generosity, that one becomes impressed by the idea of their conversation being a sort of outlet for that discomfort which disappears when people of both sexes are in balanced proportion in any locality. I know these men so well that I would trust a whole camp of lumberjacks or miners to do better service in time of a call for patriotism, or for defence of the weak, than would be given by a similar number of cultivated men who never swear or tell stories which require closure of the door. Furthermore, the lumberjacks, miners, soldiers and sailors would not use in the presence of ladies or children, or even in the presence of gentlemen, the words and ideas that are employed by the modernist school of writers for reading by ladies, children and gentlemen. This, I believe, is an important observation, and it has a bearing upon the value of rugged health in the open air as compared with the illness of those who are shackled to culture by sedentary habits.

We can only know upon a basis of knowledge. We did not know yesterday that Loeb could fertilize a sea urchin's egg chemically, or that Carrel could grow tissues of the body in his hothouse. If any one gets so far as to actually construct an amœba from colloids in the laboratory it will not shock some of us at all. It will simply be considered as an object lesson of the way in which the Creator works. We shall have no fears of people who make amœbæ, beyond the possibility of their leading some novelist to construct a Frankenstein story for the amœba to carry upon its back.

I have an idea that when we finally make life in the laboratory it will be only the lower forms like amœbæ, which cannot compete with established organic forms about them. They will perhaps be nothing but playthings for boys. This idea, however, may be crude like that of earlier men who said the flying machine would be nothing more than a toy. Perhaps the new forms of life when made in the laboratory will be guided into such development by later man's intelligence, that a million years from now it will be said that man and all organic life in his day was but a wild growth of that higher and more perfect organism which supplanted him, through his own agency according to the plans of Antecedent Mind. Man as yet has barely scratched the surface of knowledge of things in this world, and prognostications must remain within the limits of our comprehension, as the heat ray is reflected back and forth in a fog bank.

Mechanistic development of the egg without influence of cells from the other sex, as accomplished by Loeb and others, causes us to pause and ask why nature furnished two sexes anyway. We may ask if an Immaculate Conception is not now within the comprehension of science. An idea worthy of consideration is one that was proposed long ago, that the purpose of fertilization is simply to lessen pronounced parental

traits, through the effect of blending. Variation would probably be increased and the exemplar held for a shorter time, if the influence of only one sex were to be entailed to progeny among higher organic forms.

When one is engaged in any new field of work he is almost certain to make observations which have a wide bearing, and which have not previously been anticipated. When engaged in crossing pistillate flowers of the chinkapin with pollen from other species, I observed that certain pistillate flowers which had not received any pollen went on to develop nuts quite as perfectly as the pollenized flowers, even though they were protected against pollen by a covering of paper bags. Most of the unpollenized nuts developed in a normal way for the chinkapin, excepting that some of them showed a freak characteristic of abnormal development of cotyledons, which were extruded past the involucre, and in which a little chlorophyll was deposited, indicating that the seed had not come to a state of rest in the usual way. (It is possible that the embryo in unpollenized chinkapins does not arise from the female gamete at all, but that it originates from a formative building of other cells in the ovule. I am at work upon that question at the present writing. We can only speak of parthenogenesis when the embryo originates from the female gamete alone, that is, without the fusing of the female gamete with the male gamete. The growth of unfertilized ovules in these particular higher plants was a surprise.) It perhaps opens an opportunity for the masses to obtain horticultural distinction. All that people need to do is simply to cover pistillate flowers of certain trees with paper bags, protecting the flowers against pollen until the fruit has begun to develop. The bags are then removed. Selection of the progeny representing best intensive characteristics is made subsequently. In so far as I now know, this may be conducted through a series of generations with the

effect of increasing intensification of desirable characteristics. Most of the nuts were quite normal in appearance. They were fertile and grew little trees resembling the parent. These nuts could not have received pollen from any other source because the staminate flowers had all been removed, and there were no other chinkapins in the vicinity, as the locality was out of the indigenous range of the chinkapin, and the trees were in blossom before other species of chestnut were in blossom in the locality. Here evidently was an instance of parthenogenesis, or of formative budding from some kind of cell in the ovule, and biologists may now use the chinkapin for experimental work with parthenogenesis occurring in a highly developed species. Incidentally it was noted that three species of hickories and two species of walnuts apparently developed parthenogens. This observation was made only three years ago and the young trees are not large enough as yet to determine if they possess any constant peculiarities that differ from the characteristics of the parent. We would naturally anticipate intensification of certain characteristics of a parent, because many of us who are interested in biology hold the view that two sexes were intended by nature to combine characteristics of different parents in the zygote and in this way insure variation, for purposes of adaptation to environment. At the same time, this probably avoids early senescence of protoplasm belonging to breeding which is continued through parentage on the part of one ancestor alone.

The immaculate conception of nut trees, as observed in my own experimental work,—and that of lower forms of animal life as conducted by Loeb, might be spoken of as divine in origin if we characterize in that way things which are planned by nature. Such parthenogenesis, under special plans or through accidents of nature, might perhaps occur in any species

within the entire range of organic life. Dermoid ovarian cysts may represent an attempt at parthenogenesis in man.

These sometimes contain hair, teeth, mandibles, ribs and other structures belonging to fertilized ovum development. In a plant we may have a "supra perfect" organism developing from the ovule without fertilization, but in man and among the higher animals there is no record (outside of myth) of any "supra perfect" individual having been developed without fertilization of the ovum of a mother. Dermoid cysts and parthenogenic chestnuts indicate, however, that such an event as the development of a perfect animal without fertilization of the ovum might not be absolutely impossible. It is somewhat remarkable that Christian theologians have left a statement of this idea to a heathen. A perfect child developing at the site of a dermoid cyst would be extra-uterine, however, and in order to make any sort of basis for theological discussion of the point we would have to assume that an ovum began segmentation without fertilization after it had entered the uterus. Segmentation at this site without fertilization has never been held to occur excepting in explanation for the formation of a variety of intra-uterine mole.

At some time in the future a way may be found for producing virgin births, should that be desirable for any reason. We need not be surprised if Loeb or Carrel start the ovum into segmentation in the course of experimental work with animals.

Hybridizing is a sort of dynamiting process among nature's coffers. Nature's efforts have been expended for ages in keeping a walnut a walnut and preserving a mean type at that. Her efforts had been expended at keeping a hickory a hickory and preserving a mean type at that. The hybridizing process breaks forcibly into this plan of nature's and makes new combinations of many kinds. Some of these we shall select as

enormously valuable for man's purposes but not for nature's purposes, unless we include the idea of nature's holding all good stores in reserve for man.

It is already well known that nature tries to maintain a sort of balance by attracting opposites, in order to avoid too rapid intensification of characteristics of one kind. The object lesson of nature setting opposites at breeding together is often observed.

There is a natural tendency for tall men to like short women, and for big women to fall in love with small men, all in response to this plan of nature.

Much speculative philosophy has been brought to bear by Freud upon the belief that all affection dates back primarily to sexual attraction. We need not become converts under this idea any more than we are obliged to believe the great tomes of metaphysical belief which appealed to the reason quite as forcibly in former times, and which are now on the dump heaps. We must remember that metaphysics is a mental method in which the technic of reasoning outstrips the essentials of reasoning. To me the idea is repulsive—the idea that all affection dates back to that primordial impulse. To be sure we may recognize the fact that a great deal of it really does go back to sex attraction and the devil who points out that fact in a scholarly way must be given his due. The idea that I prefer, however, gives equal value to the belief that affection has its origin in the desire to be useful to our fellow man. I would rather carry the whole subject back of sex and toward a monistic belief that sexual attraction represents an incident in the course of physical combination of one of the physical entities, let us say matter. Now there is another physical entity of equal value, and that is energy. Energy and matter went on to the development of organic life and made sex attraction an incident of expediency. They pro-

gressed farther and developed a form of response that we call the soul. Let us say that the desire of men to be useful to each other has at least equal value with sex attraction in the question of race preservation and of self preservation.

Affection may spring quite as well from this origin as from sexual impulse, both being necessary for preservation of the race. As a simple example for my belief and preference let us take the case of a little child who wishes to feed a kitten. If the kitten runs away upon her approach she has no affection for that kitten. If the kitten comes to her and accepts with good grace the food which is offered, the child immediately makes a demonstration of affection toward the kitten. In other words, her joy follows an act of usefulness toward some living thing. Another example: I have often seen children in transports of angelic joy over kindly deeds which they had done at Christmas time, when the Christ spirit is brought out for a brief annual holiday. The children manifested great affection for the objects of their kindly deeds. If any philosopher wishes to prove to me that affection of a child for the kitten which she has fed, and that the origin of affection of a child toward some poor child whom she made happy, has any sexual bearing, even in its broadest and most academic sense, please lead that man up to me and give me a license to choke him.

It is safe enough to assume that at some time in the past one lot of ancestral protoplasm of the child was guided by nature to meet another lot of ancestral protoplasm, for the purpose of causing a variation in succeeding combinations of masses of protoplasm. This original attraction of protoplasmic masses, let us say, went on to develop several kinds of love, very much as several kinds of tissue, nerve and muscle were developed. We might as well say that muscle dates back to sex instinct as to say that love dates back to

that point only. Love and muscle are simply qualities of expression of the ether, occurring as twin incidents in a machine that is called man.

Now, following out the monistic interest in combinations of matter and energy, sexual impulse forms one element in affection, but the desire for usefulness represents another and equally important element of affection. A third element in affection, following the monistic parallel, would be the ethereal or spiritual element, signifying an impulse toward brotherhood of man with man, and brotherhood of man with nature, or if we wish to use the visualized form of nature,—toward God.

God is love. Platonic love may be traced back equally well to sex attraction, to the idea of usefulness to man, and equally well to the spiritual idea of usefulness to God. The cynic immediately chooses the sexual theory, as a matter of choice in studying the nature of platonic love. This fact indicates to me that cynicism is merely an expression of protoplasm in its declining stage.

A horse that stumbles at the hurdle does not stumble if he makes a sufficiently clear take-off. We need not stumble and falter over the question of origin of love and usefulness, if our take-off is from the source of all things.

The sex question has to be kept out of sight in nature's plan because it is too vulnerable for handling by people who are incompetent. Put a *Venus arenaria* flat upon the sand, leave it alone, and in a short time out comes a foot, down goes the *Venus arenaria* out of sight. Nature protects sex questions by keeping them out of sight, but easily capturable by those who know how to make good use of them.

One is apt to care less for the primal origin of love—the fundamental beginning of love—than he does for the kind of demonstration it makes to-day. I care little if man has

descended from the monkey so long as he now abstains from secret diplomacy, and acts like a highly developed being. One cannot object to the very necessary plan of taking subjects back to their primal origin for purposes of study. My only objection is to men who stay there with their studies, and, like Freud, remain seated by their dull ore when they trace a gold nugget to its original lode. Go out and spend the nugget, go out and spend love and life, even though you are clever enough to discover the primal ledge of dull stone. Spend love and life in their new forms of usefulness to the soul, instead of gloating over any crude mass of human ore in its coarse sexual and selfish beginning. According to the monistic unity idea both gold and quartz, and perhaps love and usefulness, were originally one thing, so we cannot stop at tracing love and usefulness no farther back than to sex and selfishness. We must go further back yet to our god of ether, energy and matter.

Now that the study of eugenics is being taken up seriously, more and more care will gradually be given to breeding, but we shall have to work against nature's lavishness with the love psychosis. Perhaps it is nature's plan to have the study of eugenics enter at this time in world history as a feature of natural law at a natural time for the study.

Love leading toward marriage is a psychosis (a psychoneurosis rather), furnished by nature for a purpose. The expression "love is blind" is allegorical form for describing anesthetization by the love psychosis. In cases of "falling in love" we have the common symptoms which go with other psychoses—deep breathing, disturbances of circulation, sighing respiration, loss of appetite, delusion that faults are virtues, and other signs of physical disturbance. Nature has to employ this method in order to blind young people, and to prevent them from bringing into play those intellectual faculties which

would lead two people to make an analysis of each other. As a bachelor grows older he becomes every year a little more particular and a little less desirable. He arrives also at a calculating age, and past the stage of susceptibility to love psychosis during which nature would have helped him to a wonderful companion. That constitutes an objection to long engagements. Therefore, in the cities particularly, marriage becomes more difficult, because the trained analytical faculties require such a long time for arriving at satisfactory conclusions.

In advance of preparation for the love psychosis in the monistic unity state, a young man or a young woman will first decide upon a wish to belong to the exhibition set, or to the mutual brotherhood set. These two are opposed to each other in social life. The one who is to belong to the exhibition set will search for a bargain or a partner of wealth or social position, who will be of service along the line of thinking of one and not of two. The one who is to join the brotherhood set will search for a partner whom he or she can help, and the spirit of helpfulness will bring no disappointment to the individual who finds when the love psychosis has passed on to the stage of recovery that the Pitt attitude disappears from daily action.

Murders in fits of jealousy and other overt acts of violence which are committed by people who are under the influence of the love phychosis are committed by people who are really irresponsible. They are oblivious to if not aware of the consequences of such acts. The motive is very different from the motive which leads a burglar to kill.

The psychosis of love is supplanted by nature with sane regard and esteem of people for each other, after she has attained her primary object. In case of accident or other event separating one lover from the other while both are in a

psychotic condition, the psychosis may remain and degenerate into other forms of chronic mental derangement, with permanent obsessions. The hermit in his lonely camp and the woman who withdraws from the world entirely, furnish common examples. Strong individuals are not much injured by the love psychosis, and they recuperate without much difficulty, but the weak ones may be injured for life. Among animals the love psychosis leads to peculiar demonstration. Members of the deer family may entirely lose their timidity, when in this condition, allowing easy approach, and may even become dangerous or may charge a man whom they happen to see in the woods. They become oblivious to every ordinary danger.

Two people falling in love under the influence of the psychosis are like people going under the influence of any other sort of anesthetic. At first there is full consciousness mingled with apprehension or even alarm. At the next stage there is more or less irrational and untrustworthy speech, illusions, delusions, then peculiar actions due to misconceptions; incoherence, and loss of natural consciousness. Very soon the lovers are out of it again, the psychosis is over and nature has accomplished her object. They are married. The surplus of love then changes to esteem and appreciation belonging to the intellectual set of faculties, while substantial love based upon reason may then remain through life. When one is out from the influence of the love psychosis, —and not married,— realizing that he was placed in that condition against his will, much irritation or even hatred toward the one who put him under the influence may be a result, because emotions in various forms are convertible, just as energy and the atoms of matter are convertible from one form into another.

The permanent condition of "crossed in love" is physiologic

in nature and follows the effects of continued stress of an unrelieved love psychosis. Under ordinary circumstances this would have been discharged in the course of a few months after nature had attained her object, and the individual had set himself at questions of adaptation.

Thousands of people have been brought together by the love psychosis of that trickster—nature, only to find their respective protoplasms sensitized so differently that they could not understand each other at all later. They could not vibrate to the same viewpoints. This is called incompatibility, and varies in degree according to peculiar differences in sensitization of their cell protoplasm.

I would not avoid employment of the love psychosis any more than I would avoid enjoying the beauty of a sunset on the ground that I happen to know the laws of refraction of light in masses of nimbus. It is a curious idea which some people have that to understand a thing is to destroy it. It seems better to understand and then enjoy intelligently. That would not prevent me from turning with a sigh to the faded pressed flower between leaves of the book that we first read together.

In order to protect people in a way from indiscriminate love psychosis, nature begins often by giving them silliness for the first symptom. If one could overhear the conversation between young men and young women he would often note how different they were from their real natural selves. Sometimes a young man who is highly esteemed by his fellows, who know him to be capable, clever, brave, and all that sort of thing, is held by young women to be a very silly fellow. This is nature's protection against development of the love psychosis at too early an age.

If one makes notes of the conversation at masque balls he will observe that the nature of the conversation is such as to

prevent people from developing for each other that degree of regard and esteem which is preliminary to the love psychosis, and which might interfere with the stability of the home. Vacuity, then, is one of nature's resources, used for a purpose. There is no Madame de Stael represented *en masque*. No one chooses that part. In the days of Madame de Stael, when people of the *salon* developed deep respect for one another, there was rather more promiscuous love on the whole than at present. That may have been incidental to the times; or,—for purposes of argument,—we may draw the deduction that the vacuity of present day aggregations of social exhibitors makes for preservation of the home, and is progressive in its tendency.

As a matter of fact, a system for finding proper occasion for undergoing the love psychosis has been well established in all nations for centuries. We often find that a legal proposition which seems to be new and which arouses great opposition, already exists in statute form. Now, in regard to the love psychosis, if one has time to stop and think a moment he will remember that since the beginning of history, men and women have taken the pains to follow the trite eugenic advice which the prudent Quaker gave to his son when he said to him, "I advise thee not to marry for money, my son, but to go where money is when thee wishes to marry." This is understood by all, with the exception perhaps of that fact coward—the pragmaphobe. Well, then! when we have progressed in civilization to the point where we can take the next step, it will be an easy one, for we shall pray to Apollo for health more often than we shall pray to Dives for riches. When men set out upon an expedition for a chosen place in which the love psychosis is to begin, a highly cultivated man who knows that his family is running out, will then look for Maud Muller. Preserving her from care and sorrow,—two

people will be benefited. The same old method in love on the whole, but with a nobler purpose, under the banner of eugenics. A deeper love may be grounded in cosmic urge.

When eugenists first proposed the introduction of foresight into the selection of life partners, people cried out in chorus after the manner of taunting school children, "Stock farm! Stock farm! Stock farm!" These people did not stop to think that such a system was already in existence. It had really existed as what we might call statute law in sociology, with authoritative example in the case of the marriage dot. The marriage dot custom furnished precedent. Eugenists may simply ask good people to remember that a foresight system had already been established, and they may call attention to the fact that the time has now arrived for people to grow beyond this crude and selfish manifestation of the instinct of self-preservation, and look to a larger and finer appreciation of the principle as it may be applied in the interest of race preservation. This stopping to think is a pretty painful process for many people. They cannot bear the jolts. It causes loud outcry. Carlyle, criticising Luther, said that he had set at thinking people who had no right to think. We shall have very much the same experience with propaganda of the idea that a man is only what his microbes allow him to be. Every physiologist in the world knows at this moment that it is true. He knows that he could not be alive excepting for the microbe and that the microbe will presumably cause his death. He has not stopped to think that all intermediate activities of man are either allowed or instigated by the microbe. This matter of stopping to think is such a violent procedure that it causes tremendous upheaval of what men already know. People then become angered at others for holding them up at the muzzle of a fact and making them stop and deliver knowledge which they have about them. We funny little

jiggers here on earth do get so anachronously mad even in an ordinary dispute between neighbors. It is usually the one who is in the wrong who is maddest. He is instinctively using all of his self-protective emotions in the innate consciousness of the probability of his being wrong. In that respect he is like the metaphysician, who, suspecting that he may be wrong, proceeds to tangle up an idea in a web, like a spider that has caught the leg of an ichneumon fly. Spider, metaphysician, mad neighbor, and anti-eugenist are in great danger, because the facts are after them unless they succeed in tangling things up in a web. A certain little anthropomorphic god is laughing up his sleeve these days over the eugenics question.

A knowledge of eugenics will show many well-meaning people the need for discretion in the exercise of their commendable natural inclinations. I know the details of one case in which a pretty but feeble-minded girl was taken into service by a kindly maiden lady. The girl became pregnant by a worthless fellow in the vicinity. The good woman saw to it that they were promptly married. When the child was born she gave the couple a little property which would allow them to be self-supporting. The worthless husband did not manage to make a living, so in the kindness of her heart the good friend found a place for the couple with a fairly prosperous epileptic, who was not married on account of his infirmity. The worthless husband died when there were two children. There are now five children of badly defective inheritance, without moral or physical strength, to exert their influence among the people of the state. And all this because of a most kindly display of good intention on the part of one neighbor.

If the subject of eugenics is brought forward very quietly and systematically without much oratory, people will think

about it intently, and they will act instinctively in the direction of progress. The public is pretty sensible on the whole when its emotions are not aroused. 'Ware the orator!

Burbank says that the people are more crossed than any other plants or animals, and we have a discordant mingling of both good and bad qualities in consequence.

The system of eugenics in the monistic unity state will not include the plan of Burbank of selecting a few plants from thousands of seedlings and then killing off the rest, nor will it subject humanity to the rules of the stock farm. Its pedagogy, however, will teach the lessons of Burbank and of the stock farm to all young people. They will then be free to follow a noble race-preserving system. The public is already thinking about the subject and unconsciously doing about what eugenists wish people to do consciously.

The eugenist will not lay out a scientific plan for marriage, but will simply plan to go systematically to where he expects to find his ideal in health, beauty, intellect, or spirituality. If devotion to duty and unselfishness constitute a part of his ideal, he will seek out the young women who are devoting their lives to aged parents or invalid relatives and thereby giving prima facie evidence of that part of their characters. Having taken this first step, he may then safely leave the rest to nature's plan for developing a love psychosis. It will simply be a matter of intelligent choice in the first direction, just as one goes to Delmonico's for dinner instead of to the railroad station. Eugenics is nothing more nor less than a matter of educated taste in application of an old principle. The young man will go to places where the most useful women are to be found, industrial schools, refined homes in which girls have to work, to the home economics departments of colleges. He will note in what regard young women in these

places are held by their peers. He will observe the extent to which they are interested in physical exercise.

There is no particular reason for believing that marriage is a static social custom, and that it is to endure for a million years more as a fixed custom. Marriage is simply the best expediency method which has been devised up to the present time for ensuring to the state the best development of children, mentally, morally and physically. The final interest of the state is in its children only. Marriage will occur less and less frequently as cultural limitations are approached in any one nation and as the breeding instinct is gradually retired. This is one of nature's plans for limiting population, and she may apply still more severe measures in the future. According to Rittenhouse, of the Equitable Life Assurance Society, thirty-nine out of every one hundred men in the United States, over twenty years of age, are unmarried at the present time. According to the statistics of Professor Wilcox of Cornell University the death rate of unmarried men between the ages of thirty and thirty-nine is 119 per cent. greater than that for married men of the same ages. These statistics are in line with my assumption that the breeding instinct ceases first in those who are least well fitted for breeding because of physical defects. Defects are incidentally shown in the greater vulnerability of unmarried men to nature's regulating agent, the microbe. There may be little or no deviation from a normal type in some of the unmarried men, but the group as a whole incidentally includes those who choose not to marry because of an instinctive feeling that they are not fitted to marry. This latter group is the one with highly vulnerable protoplasm, and the microbic inroads upon members of this particular group raise the death rate statistics of bachelors as a whole. Marriage then is still the best custom for ensuring to the state the best sorts of children for perpetuating the state. Marriage is

the best index of the degree of resistance which the people of a state are showing against influences of decline. These two features alone would seem to indicate that marriage will continue for as long a time as the present cultural period endures among the civilized nations which are now upon the earth. It may last for as long a time as the fox or the wild goose continues to choose his loyal mate. Those who are burning with a neurotic desire to change everything, including marriage custom, are Æsop's foxes with defective tails. The nation which first appreciates this fact and which aims at developing a system which will perpetuate the breeding instinct and put it into practical application, will start off well equipped in a race for the prize of becoming the chosen nation. Almost any biologist could formulate such a system for almost any civilized nation to-day. He would simply have to arrange his principles of eugenics, and plan for effective oxygenation of microbe toxins. I would not presume to say that the people of a nation would follow any such system. They would probably do nothing of the sort, because nature is reserving such wisdom for a nation which prefers facts to sentimentality.

Will people ever be systematically hybridized like valuable plants? It is not beyond the bounds of possibility, although belonging to a far distant future. The object lessons of horticultural methods and of stock farm methods have definite intrinsic value, and are even now being applied in a crude way by those eugenists who represent the first path breakers. The first pioneers will probably do about as much harm as good, because they will try to substitute for our instincts, which are somewhat defective guides, a one-sided knowledge which would be entirely defective. Our instincts furnish at present the best guide, but an unreliable guide, because they consist of a job lot of old primal instincts patched up by higher intelligence into "something that will do." An old rat knows better

than to try to live according to instincts "that will do." He quickly perceives the spirit of a trap even though he lacks the higher intelligence for appreciating its mechanical niceties. Higher intelligence may be employed in making a trap, but it cannot catch an old rat. The path-breakers in eugenics,—guided by right motive,—will at first act unwisely. This will bring about that ridicule which will serve as a balancing corrective force. The motive that leads to the doing of absurd things is often a motive that leads to success in the end, and the next step in eugenic methods will be based upon the experience which results from the conflict between unwise action and ridicule. All the civilized nations on earth up to the present time have represented what one might call a wild growth of culture. God made one grape a little better than another, and man selected the best grape for his purposes and cultivated it. That represented the first stage in culture as applied to the grape. Man then supplemented God's work by hybridizing the best grapes and securing a still better one for his purposes than would have occurred in nature. We may fairly assume that such will be the history of man eventually. The best types may be chosen by people of the chosen race, with elimination of types that are not desirable. Our wild growth of civilization leads to violent adjustments which are destructive. In the matter of such basic social needs as good financial methods, good individuals, and good corporations, cities and nations have all been alike in growing wild up to the present time. A group of the leading nations shows at the present time debts which are roughly estimated at forty-two billion dollars, with interest at one billion seven hundred million dollars annually. Their annual revenues amount to eleven billion six hundred million dollars. The governments expend eleven billion seven hundred million dollars, leaving combined deficits of one hundred million dollars per year.

Public administrators, corporations, and individuals, are all alike in disregarding the matter of a deficit of one hundred millions of dollars per year in the course of our present wild growth of culture.

The eugenist is the only one whose hand on the tiller can bring us up into the wind and start the race off on another tack. The *double entendre* is complete—for the race is always a race with the microbe.

Bacteriology is to be the chief producing science, pedagogy is to be the chief distributing science. Production and distribution are to take their respective positions toward other sciences, as they do in matters of commerce. The reason why principles relating to production and distribution were first grouped about commerce is because in that field man first perceived an obvious need. Obvious needs relate to stages in culture, and change with the conditions of progress and culture.

Decadence will not cease through our simply knowing of its terms. Knowing its terms simply allows us to raise it to the level of a subject that is understood. The best nation will then take its lead more rapidly, but the microbe will continue to meet all advances in its own way.

According to stock farm statistics, if the mother is decadent, the effect of her illness will be much more pronounced upon the progeny than if the father is decadent. If both parents are decadent, may Heaven help children! Some of the decadent writers think they are founding a school, while it is a hospital they are founding instead. It is illness which causes the delusion. What they believe is to be a literary school will be a literary hospital for their readers. Thousands of readers of modern fiction are in a literary hospital because their idols exhale noxious ideas.

We do not know to what extent there is actually defective

cell construction of the brain and of the ductless glands of decadent people, but we may freely assume a defective condition to be present, because deranged function in general is so closely associated with deranged structure. We have at the same time, in the same people, other defective conditions that are tangible. All of us are likely to have defective teeth, defective scapulæ, defective mandibles, defective structures to some degree. We have raced along too carelessly to have developed many perfect physiques.

The protective organs (ductless glands and other special cell groups) are for the purpose of preventing bacteria from over-running the body, but when we have an arrested development of the protective organs as a feature of decadence,—like that shown more definitely in arrested development of the ear, of the jaw, of a toe,—then microbes begin to say, like Kaa, "Good hunting!"

There are at the present day many geniuses in business, science, art, literature. How many of them are without digestive troubles? Tell me also about their children—if they have any. Show me the proportion of children of geniuses who do not have digestive trouble. They have mostly lost the efficiency of their protective organs, and are getting ready for the bonfire. Nature is setting her microbes at work on them because the family was getting ahead too fast, just as she sets the microbe at work upon the oak that is growing too fast in the forest without sufficient lignification of shoots. Nature insists upon an exemplar type in everything organic. There is not much danger from vast accumulations of wealth. It is soon in the hands of the public again. Bacteria will undermine it, by preventing the development of children to manage it. We correct wrong business methods in a small way, but when nature is displeased, she lugs people off to the bonfire by the wholesale and throws them in. The gambler

and his children may go in early, while the magnate is spared for a longer time, but in the end he goes in with his children. Temper your fears regarding vast accumulations of capital by knowledge of what the microbe will do. Nature preserves the balance by refusing to bestow children who can increase a fortune for many generations dangerously.

Some people feel hurt when we suggest that their actions are the result of doubling of the rose. I observe that it is chiefly people who are developing propaganda which would be nipped in the bud by the idea, if that is not mixed metaphor. Others laugh and say they know they are paying the penalty of high civilization, and try to adjust themselves accordingly. The one whose microbes allow him to laugh may easily take part in a new system of eugenics. We know that highly cultivated animals escaping to the woods get back to good physical characteristics in a generation or two. Any human family finding that it is moving too fast, developing tuberculosis, insanity, worklessness and high cost of living, can find a way for escaping from effects of over-culture for a few generations. Rebuilding the family will no doubt be done systematically by the nation which finally assumes control in the world. We already know how it may be accomplished.

If we doctors wish to speak frankly to our patients about their belonging to the double rose group, it is important to impress at the outset the fact of compensation in their brighter minds and deeper souls, in association with a physique which is not strong enough to carry so much effect of civilization. The mind of a decadent is often like the headlight suitable for a great locomotive, attached to a little bicycle.

Bacteria attack a declining protoplasm just as they attack that which is completely dead. It is only a matter of comparative degree of cellular destruction.

An athlete beginning to go out of training is more in danger

from infections, even though he lives in the country, than the old clothing store keeper in the city, who sits in front of his shop in his slippers all day, and takes no more exercise than to walk to the back of his shop occasionally. The retired athlete's cells are relatively more decadent, consequently more vulnerable.

The nature of arrested development in various structures of cultivated plants and animals consists in lack of normal cell building. Plants may have such a freaky soma cell growth as fascination for instance. If sex cells change over to soma cells, the inbred pigeon may lose at the same time integrity of quill follicle cells which select coloring agents. Colors belonging to the wild bird are then changed into various whites, blacks and greys. Irregular cell building in man may be represented in facial asymmetry, or in lack of Graafian follicles in the ovary. Function is so closely associated with structure that defective development of organs is likely to be associated with defective states of mental action, or of nutritional processes. Much controversy has taken place over the question if acquired characteristics can be entailed to progeny. This question of inheritance of acquired characters has been studied upon a basis of the most obvious characters. Darwin and Mendel dealt with problems of adult life, chiefly because these were the most obvious.

If we take the question back to the influence of microbic toxins upon the chromosomes of cell nuclei and assume that toxic traumatism inflicted upon chromosomes of cells of any one structure will lead to hereditary vulnerability of cells of similar structure in progeny, we easily enough arrive at the hypothesis that an acquired characteristic (defective cells of a given structure) is inherited by progeny. Beginning from this hypothesis we may then extend the theory to include appetency, because winning cells maintaining their chromatine

efficiency would take the place of cells eliminated by microbic traumatism. The winning cells would naturally be those of structures most actively engaged in daily work, while the cells of structures not so actively engaged in daily work (containing less *élan vital*) would naturally be vulnerable to microbic toxins. Structure and function being closely allied we may assume that inherited characters of mind are due to an inherited character of physical brain cells. If the physical brain cells of a parent represent acquired character, and if the progeny of the parent have characteristics of mind like those of the parent, we may assume that in this case we are dealing with acquired characters in brain cell formation which are transmitted to progeny.

Thus a parent with high arched palate may entail the same type of palate to a child through entailment of plasm tendency, but if the child gives close attention to physical development and to hygiene, the child of this child may have a normal palate again, and succeeding generations of children may have normal palates, although the defect of high arched palate occurred at one time in one or two ancestors. (Omitting argument about the other parent.) Nature pulls toward maintenance of an exemplar, and this pull is so tremendous that we have only to remove the microbic interference and the tendency will then be toward return to an exemplar type. The pull toward normal type is so strong that I believe the progeny of two insane parents may often be so guided by the rules of mental and physical hygiene that their own children will be far less likely to develop insanity, and the insane tendency can probably be bred out by following rules for securing oxidation and avoidance of untoward microbic injury. Under present customs the tendency is toward breeding defective children, because the vicious circle includes the idea of a constantly increasing microbic injury, in proportion as defective struc-

tures lose control over normal cell building and normal nutritional processes.

The acquired characteristic of fasciation in plants when once established has a tendency to become hereditary, as we note in coxcomb (*Celosia*). An abundance of fertilizer is apparently necessary to maintain a tendency to fasciation in this species, but perhaps it is not simply a question of over-feeding so much as the kind of over-feeding, because I have observed fasciation in a daisy (*Leucanthemum*) growing in the shade, and in a golden-rod (*Solidago*) growing in poor soil. It is more likely that certain bacteria cause cell injury with regularity, in the presence of disturbances of nutrition of a certain kind. The same thing may occur from relative over-feeding from some one substance in the soil which on the whole may be poor.

A typical group of protective organs is the chromaffin group, and when we have an arrested development occurring in this group of protective organs, and note the dire consequences, it indicates to what degree variation in individuals may depend upon arrested development in other sets of protective organs, of which we know less.

The increase of cancer may be due to increase in the proportion of tissues left in their embryonic stage, in the course of development of an individual, under the influence of poisoned protoplasm,—with arrested development of its structures. The same is probably true of benign tumors. It is not necessary that these toxins be of bacterial origin directly, although toxins of defective metabolism of any sort are apt to rest upon a microbic basis fundamentally. Williams and Beveridge have recently shown that the red blood cells deal with cleavage products of protoplasmic activity, supplementing the work of white cells, which latter deal with full sized protein molecules and bodies. Both groups of blood cells

relieve the ultimate tissues from the labor of protecting themselves against nitrogen products that might be harmful. We may conceive of the white blood cells and the red blood cells as constituting integral parts of two viscera in a state of solution but engaged in carrying on work after the manner of a fixed viscus (like the liver). Red blood cells and white blood cells are travelling agents of the liver cells, but all three sets of cells constitute three viscera belonging to one concern. Checks to development of embryonic cells may also be lessened through development of the checking agents. The cure of even a single case of cancer means something requiring explanation. We know that cure of certain superficial cancers in the early stages occurs rather frequently under the influence of the high penetrating X-ray, violet light, and radium. We have sometimes through any of these resources stopped the development of cancer without reference to the manner in which it was incited to growth. In seeking to limit the increase of neoplasms it seems to me that we are to concern ourselves not only with methods for curing neoplasms in the individual, but that we must take a step further back for our perspective, and note the probable influences of disturbed protoplasm of antecedents in the family. We must learn why new cells lose chromosomes.

One reason why arrested development of organs is more often found in women in civilized countries is because colonic stasis is so much more common in such countries, furnishing a toxic cause for the beginning of that vicious circle which leads to cell injury of the individual and to hereditary defective cell structure in progeny.

In questions of heredity we are bound to make use of stock farm statistics, no matter whether Theology likes to do so or not. The owner of one very large stock farm of thoroughbred horses is reported as saying that the influence of the dam

amounts to about fifty per cent., the influence of the sire about twenty per cent., and training about thirty per cent. The mother may have more influence than the father upon the character of children as development in a family progresses, according to stock farm comparisons. (No doubt different animals vary in this respect, however.)

If a mother is poisoned by microbe toxins we must assume that physical cells of her developing ovum are influenced by chemical toxin, and that a defective child will result from such a chemico-physical reaction. Perhaps nature, knowing this predominating influence of the mother, purposely lessens the potency of decadent women more rapidly than the potency of decadent men is lessened. Nature, apparently, halts breeding from the mother's side first, by giving women a much larger proportion of defective sex organs,—far out of proportion to defective sex organs in men. Cultivated women are very prone to have something wrong in the pelvis, and mammary glands which secrete too little milk.

We know that the toxins from bacteria of a chronic tooth abscess can act upon cells of various joint structures in such a way as to cause arthritis deformans. Other bacterial toxins also call out a similar response from cells of these structures. This probably means that bone or marrow cells which have a special function in manufacturing certain protective cells are over-stimulated by special toxins. If such definite distinct influence is produced by "remote" toxins, we are awakened to the fact that bacteriology has not yet made even a fair beginning in the study of the influence of toxins of a mother upon her developing ovum. We did not even know that bacteria existed until the work of Cohn appeared in 1872. Since that time no object in organic life has received more attention. The whole world now knows that the biggest thing in it is the littlest thing and yet we are familiar with

nothing more than the introductory pages of the life history of the bacterium in its relation to man.

Out-of-door life for the mother means less toxin for the developing ovum. If a child is born with arrested development of the adrenal system, for instance (pituitary, thyroid, adrenals), because of toxic mother impression, the appearance of tuberculosis or of dementia præcox, or of both, in the child later might belong in natural sequence, through lack of protection due to a defective adrenal system.

Cultivation of man and of the potato leads to the same end-result. The potato stops breeding by way of seeds. (Propagation by tubers is carried on for awhile by potatoes, but when the tubers become too highly developed they in turn fall a prey to bacteria.) Bacteria then wipe out highly cultivated man and highly cultivated potato. When I was a boy, the potatoes which filled the market: Mercer, Peach Blow, Cuzco, Coleman seedling, and Prince Albert, are now all gone. *Cultura fecit!*

Although varietal hybrids of potatoes (like those of other plants and animals) run out of protoplasmic energy after temporary exhibition of remarkable vitality, the species of wild potato retain a great permanent fund of energy which is held down to mean type by means of nature's checks against mutation. These wild potatoes continue to make flowers and seeds for centuries without much change. When hybrids or sports occur, however, there may be a sudden flaring up of some remarkable varietal type. This type at first makes seeds as well as tubers, then degenerates and makes tubers only. Finally the tubers present senescent protoplasm and become particularly vulnerable to microbic attack.

We are familiar with the Eurasian hybrid type among men. The protoplasmic history of Balkania is different from the

protoplasmic history of Mexico or of the Philippines, however, because of social limitations which direct the course of progeny in these different countries. In Balkania we have representatives of a number of nations, and of different races, but these remain so distinct from each other that there is little intermingling by marriage, and furthermore little joint action in state politics, and no one element existing in a dominating degree of strength.

In Mexico and in the Philippines we have the formation of violent hybrids between people of different races, but with people who are not fitted for making combinations to form a dominant mean type. An occasional sport (Diaz) makes explosive expenditure of energy but then disappears. This corresponds to the peachblow potato which made great display of energy and then quickly ran out of its fund of protoplasmic energy. Sometimes the varietal hybrid as well as the specific hybrid makes almost a rocket-like display of its fund of protoplasmic energy and then runs out; examples, Napoleon, Wilson strawberry. A very strong varietal hybrid form expending its energy more gradually, exercises dominant influence for a long time: Puritan, snow apple, Cavalier, Seckel pear. None of these latter are violent hybrids and do not so freely lose the checks which nature places upon maintenance of a species or race which carries the chief permanent investment fund of protoplasmic energy. Offshoots which are constantly occurring away from the main fund of protoplasmic energy in a species or race have a tendency to discharge their separate fund of energy explosively. From this, the biologist assumes, we shall continue to have disturbances in Mexico and in the Philippines until some combination of varietal types occurs which will give us dominant varietal hybrids. In Balkania, on the other hand, we shall look for disturbances to continue until some external repressive force welds together the loose

masses of small nations which do not as yet cohere through influence of forces acting over national distances without regard to any question of hybrid forms.

Even though the logical end of culture is extinction of the race in plants and in men, I would not limit culture—but would understand it only, and guide its processes better for the knowing how. Men should know of the best there is in music, the influences leading to renaissance in architecture, the schools in painting, the difference between "Three Weeks" and "Paradise Lost" in literature. We must blindly follow the laws of nature, however, and eventually take our turn with the fatal results of culture.

The world seems to be going to the bad faster than it really is because doubling roses are in evidence with disproportionate self expression, consequently attracting most attention. As a matter of fact, the great stable healthy normal mass of people is increasing also, quite sufficiently for our present needs. The normal mass will increase in proportion over the double roses under new eugenics.

The defectives who suffer from hereditary asthenia are very apt to be suffering from starvation also, because of the dietary plans laid out scientifically for them. When a patient comes to the office for some operation and I find that he has been following a rigid diet plan (a square piece of bread for breakfast, two round pieces of bread for luncheon, and crossed pieces for dinner), I sometimes tell him to go out and get a full meal of corned beef and cabbage with a glass of beer and he will not require any operation. Such a patient may not take the advice literally, but in a general way, and will gain rapidly in weight, courage and spirits. He had come to the office for surgery and I cut off nothing but his scientific dietary list. His hereditary tendency to asthenia was not cured. His misery which was due to actual starvation was relieved.

It is not only the hereditary asthenic who presents marked evidences of doubling of the rose. Big lusty artists would often pass for ideal types of men and women were it not for the childish display of emotions which indicate a lack of balance due to arrested development of a part of their faculties. We often see among these talented people, infantile manifestations of jealousy, anger, and envy, together with a lack of responsibility in their attitude toward obligations. These features are common to the stage of decline, with the appearance of genius as an added symptom.

An opera company consists so largely of doubling roses that directing gardeners have a most startling time, requiring genius on their own part for the management. Authors perhaps come next in order with their proportion of double roses, and the publisher as gardener has to graft plain practical business into the ideas of authors, whose very stock-in-trade is imagination.

The doubling roses of opera are particularly hard to manage because they are apt to be so well developed physically,—well developed vocal cords commonly being associated with an irresistibly powerful physical habit. This in the case of artists does not necessarily mean good health. Balance is beginning to become lost. Childish mental traits make constant rumpus among artists who appear to be well developed physically, and they are often "indisposed." In the case of great artists as compared with great scientists—the great scientist devotes himself to outer things of the world at large, while the artist turns his direction inward, and develops leading factors in response to the power of his ego. It seems almost essential that a great artist should have that physical strength which goes with recent ascent from the peasantry or laboring classes, in order to withstand the internal bursting pressure of the ego. We all meet with well rounded mental

and physical types among artists, but these people know very well what is meant by reference to signs of decadence among their colleagues. An artist may have great genius without signs of decadence, but it is among geniuses that we most often find striking evidences of moral and physical decline.

According to our present system of breeding, with intensification of good and bad qualities alike, we may find among the doubling roses an intensification of certain qualities which are destructive. For instance, among artists who represent the doubling rose class, intensification of jealousy is almost characteristic.

The whole trend of decadence is based upon biologic conditions with their peculiar pathology. The tendency of members of our species to fool each other is deeply seated. A newspaper not long ago sent its delivery carts about with ringing gongs, and a brazen legend, "Largest Circulation in New York" staring out from the sides of each cart. People with a sense of humor no doubt quickly saw the double meaning, but the authorities found it best to suppress a fraudulent intent. Proprietors of the newspaper perhaps had a psychology which led them to feel that a mendacious leading statement would attract people to a possible search for truth in the news columns.

Two advertisements of cows for sale, in an agricultural paper, recently attracted my attention. The cows had been photographed with hind legs a little nearer than fore legs to the camera. It seemed worth while to run down to the library and look over a number of agricultural papers to see if the simple farmer man in collusion with the advertising man had intentionally done this sort of thing. Every one of the cow advertisements that carried a picture carried this intent to mislead. If the rear hindquarters of the advertiser had been

photographed in this same way it would have left his head in proper perspective.

If we cannot do better than this in America, then Shame upon you, America! Go to the scrap heap of nations as fast as you like!

It is a curious habit of our species to believe what we prefer to believe, rather than what reason would lead us to think is true, and this engenders so many complications that nature was obliged to give us the urban habit in order to persuade us to dispose of ourselves, and in that way get such a large lot of faulty organism jobs of hers out of the way. Nature probably could not foresee all of the results of this habit of believing what we prefer to believe rather than believing what is true. She made a great many other miscalculations. For instance, the danger from weak walled inguinal canals when she got us up on our hind legs and set us at walking erect. Man as an erect animal has been on this earth a comparatively short time, perhaps not even five million years. When rising and walking on his hind legs he began to show so much structural weakness that many errors in design came out. It is evident that nature will have to begin all over again in order to profit by her experience. A number of bone bearing, muscle traction lines and visceral supports will need to be arranged very differently in the next lot of organic beings which nature wishes to develop highly upon this earth.

Man was evidently planned in a theoretical way by Antecedent Mind, and if he does not work out practically at all points, we are nevertheless struck with awe at the sublimity of a mind which has done such remarkable things on the whole with its various creatures. Man must indeed be closely akin to Antecedent Mind, because man himself commonly finds that his own theoretical propositions work out imperfectly

in practical detail. Apparently Antecedent Mind could not foretell the up-hill work of the colon, weakness of the walls of the inguinal canal, or badly placed fulcrums and levers of bone which work at disadvantage. A large number of other structural defects are appearing. We are left to assume that Antecedent Mind either did not quite know how things were going to work out in the experiment of getting man into the erect position, or else the matter was left to a manager for this earth and the mistakes followed. In any event, we are left with the conclusion that Antecedent Mind could not manage the question,—unless it was a plan on the part of nature to have these structural defects appear for the purpose of carrying off and gradually weeding out those in whom they were most marked. Structural weakness includes ptosis of abdominal viscera, either of the congenital or the acquired types. Carrel has shown how the death of tissue cells is due to their inability to eliminate waste products, but his studies have not included the idea of inability of sagging viscera to eliminate bacterial toxins well. I believe such toxins to be much more injurious than waste products proper. It is probable that toxins from the entire gastro-intestinal tract produce malign influence at times, perhaps quite as much as those of the colonic group of bacteria, but the colonic group has been studied so extensively during the past ten years that we are standing upon firm ground when tracing definite toxic influences to the colonic group alone. The lungs, liver, spleen, kidneys, and other old-fashioned vital organs are known to be injured by waste products from body cells and to suffer from overwork in eliminating them, but we have only recently begun to take up the subject of up-to-date organs like the ductless glands, and their response to influences of bacterial products. It will be another four or five years before we are well on our way with the facts relating to microbic allergy

relating to all of the organs of the body, including different kinds of blood cells under the classification of "organs in a state of solution."

Fifty per cent. of the people walking up Broadway at this moment, —or Piccadilly, or Unter den Linden, or the Boulevard des Italiens,—are distinctly and abnormally impressed right now by some microbic toxin in excess. Every remaining individual (making one hundred per cent. of the whole) is influenced to some degree by the microbe, beneficially or harmfully as the case may be. One hundred per cent. of all the people in the civilized world at this moment who are looking at paintings or going shopping, or mountain climbing, or at work in the factory, are more or less under the influence of harmful or beneficial microbes.

Whenever we talk about the proportion of people who are poisoned by excess of toxins we must at the same time remember that one hundred per cent. of all people, both civilized and uncivilized, are under microbic influence of one sort or another, good or bad.

Nature's insistence upon preserving an exemplar extends to the microbic control of all activities in man. People who are not engaged in useful occupation are hurried toward the bonfire; but so likewise are the ones who are abnormally active, injuring that protoplasm which nature wishes to have preserved along certain lines of integrity, in order to insure the descent of sound progeny. Both of those variants from the exemplar, the unemployed and the over-employed, are Elims headed toward the bonfire by nature in order to preserve the exemplar.

A great city is a vast bonfire in which the ends of families burn up according to nature's plans. New York is not different from Paris. Doubling roses come into the light for a short time and then perish in the bonfire.

How often do we observe that people of fine stock come to the cities and bear asthenic children. A generation or two later, the family has all burned up, because the children show allergy to toxins of bacteria when protective organs become decadent through lack of sufficient exercise and oxidation.

People of no particular occupation in the city, who are trying to find satisfaction in amusement, often become so weary of it that very little cheer is observed in what they call joy. They belong to a group that we might call "cheerless joyers." They are commonly in a state of fevered unrest, with no satisfactions in life to serve as anchors. Like a flock of sheep going to their doom, they are apparently gamboling merrily on the way, but with sad bleats of questions at the same time. They represent that part of the city which is on the way to the bonfire—the waste element which is to be disposed of. The cheerless joyers, with a certain degree of resignation, sit through the tiresome cabaret, or in the early hours of the morning move to another place for the same old jokes and more wine. We have at the same time, in the city, new uplift movements of great activity.

Who has the happier inside feeling—one who is listening to the spontaneous evening song of an oven bird among the surroundings of genuine nature, or one who is listening to the evening song of a self-conscious affected singer at a parlor entertainment, among surroundings of human exhibition?

People who are deprived of the advantages of study of the great world of nature because of their confinement to town, have a tendency to become specialists in the study of just one species, and to devote themselves to human affairs only. The old teleologists who believed that the world was made for man alone, presented an instance of this bad effect of town life. If we base our judgment upon the fact that our structural defects and our moral and mental defects become ex-

aggerated under urban conditions, we may at least assume that it is not the city man in whom nature is most interested; the presence of these defects seems to indicate that man is just one of the vast number of species in organic life that nature is trying out in the best way at her disposal, and that many mistakes remain in evidence.

The city man has made a curious application of the word "natural" for purposes of distinction between his mental processes and other happenings in nature, but at the present time some of us find no lines of demarcation between the natural man and spiritual man, natural philosophy and the study of physics, natural philosophy and intellectual philosophy. At the present time we hold that natural religion is that form of superstition with which man instinctively replaces knowledge, while revealed religion comprehends that satisfaction or ecstasy which is based upon the revelations of the microscope, the spectroscope, the telescope, and other "scopes," insofar as they are instruments of precision.

A city is merely an incident, resembling protoplasm or any other thing on this earth. All things are in a state of constant flux,—being built up on one side and torn down on the other,—both processes going on at the same time. The simultaneous building up and breaking down of character and health are simply incidents in harmony with all movements belonging to this earth. We may place them in serial order if we like, as follows:

New York—a city of man, in a state of flux, being built up on the one side and broken down and wasted on the other.

Man—a city of amœbæ in a state of flux, etc., etc.

Amœba—a city of molecules in a state of flux, etc.

Molecule—a city of atoms in a state of flux, etc.

Atom—a city of sub-atoms in a state of flux, etc.

It is only recently, since we have come to know uranium

and thorium, that we could consider the atom as being in a state of flux,—and capable of being placed in this companionship with a city. Every known aggregation in nature then is a city, and New York is only a small parallel incident in nature's scheme, obeying the laws of nature like men and their amœbæ (cells) and their protoplasm, and its molecules, and their atoms, and their sub-atoms, all in a state of flux, being built up on the one side and broken down on the other at the same moment.

The chief difference between man and the lower animals in connection with waste is that man plays his part through the abetting of his higher intelligence. Imagine a red squirrel spending his evenings in expensive cheerless joy at the variety show and a late supper with too much wine and smoke, coming home disgusted with the emptiness of life and saying "good night" to some one who ought not to have been with him anyway. The intelligence of the red squirrel is not sufficient to allow him to do that. Imagine him going around with a whining moan because other red squirrels did not treat him right. Only higher intelligence could allow him to do that.

Imagine Mrs. Red Squirrel coming from a hole in the apple tree by my gate, joining Mrs. Red Squirrel from a hole in the hickory tree down along the stone wall, and the two seated upon a limb enjoying gossip about Mrs. Red Squirrel in the big water oak at the bend in the road. Nothing but higher intelligence could lead them to do that.

When several women get together on the veranda on a summer hotel they are not nearly so injurious as they imagine themselves to be. The reason for this is because women understand each other so well. Let anything really serious happen to someone who is under discussion and there will be prompt enough response with sympathy and genuine self-sacrifice, if the occasion furnishes opportunity. The under-

lying spirit of generosity on the veranda is as large as in a camp of lumberjacks. What seems to be destructive influence is superficial only, and due to natural desire for mental stimulus which is handiest and obtainable with the least degree of effort. Whenever we think of waste, we are to remember that the oak tree in nature's plan wastes a million seeds in order to furnish one for survival. Waste of small words and ideas belongs in the same category. The great social tree with its enduring trunk, and limbs of justice, generosity, and sympathy, remains unaffected by the waste of a million gossipy words that come only from the tip ends of little branches.

To-morrow there will be a change in the attitude of people in village life in their feelings towards each other, throughout the whole world. This change will come when a new pedagogy teaches people that neighbors' quarrels belong to the subject of natural warfare and this subject is under guidance by nature. Neighbors will come to know that quarrels are inevitable but they will learn more about them and not take them in such a serious personal way. At the present time neighbors' quarrels in villages seem to the people to be personal affairs. In the crude stage of our civilization people cannot understand that personal quarrels represent only one feature of the whole warfare question,—of that great warfare which nature is conducting incessantly.

An era of better feeling all around will come, not only between people of villages but also of the cities, when folks get to understand that quarrels belong to natural warfare, that they are unavoidable and that they are not personal matters fundamentally. Each man now believes that his troubles are very personal, but they are not.

Go out and look at the glorious full January moon. See it in its roundness, with the old mountains and valleys in plain

view. Then think of it as only a chunk, and not a very big one at that, hurled off with our small handful of planets from the sun,—which in itself does not amount to so very much as suns go. Lord! but everything we know about is so small!

I would like to go to some of the old valleys of the moon and hunt up bones of animals which lived there before plant life on the moon had used up all of its water, in the same way as things are now going on with us. This earth will soon be like the moon, and it makes very little difference if in the meantime Jones manages to form a new school in literature, or Smith succeeds in making a million dollars, or Brown completes his engineering project with a tunnel, or White wins his case in court. All of these things seem to be tremendously important right now, to those of us who are impatient for great accomplishment. All of men's affairs are very small, no matter whether men win or lose, because this earth, like the moon, and even the sun, are such little things when we compare them with the rest of their cousins in the zenith.

Protoplasm can develop only just so far in man, according to limits set by nature, and a nation can develop only so far as development of protoplasm in its men is allowed.

Society always follows the laws of protoplasm because its individuals consist of protoplasm. It is in a state of constant flux. While it is being broken down on one side by the profligate and the time waster, it is being built up on the other side by new methods like the Montessori system in the kindergarten, and by departments of household economics in the colleges. Methods are being advanced on every hand by ascendants simultaneously with frivolous wasting of talents and time by descendants. One set is using more than a third of the brain,—the proportion which psychologists tell us is commonly used

by the average man. The other set is allowing the brain to sink down to that one-tenth of its efficiency which psychologists tell us is the proportion commonly employed by those not engaged in actual work.

The flux of protoplasm has been visualized by man since the earliest days of history, as conflict between Angel and Devil, or between some corresponding symbolic beings.

Walk down Times Square on any pleasant evening,—note the proportion of elims who are evidently headed for the bonfire, and a feeling of great pity will come into your heart,—for these are all human beings whom you are observing. They are all people capable of knowing what is fine in the world; they are your brothers and sisters in humanity, but headed for the bonfire in nature's cruel plan of waste.

When industrial occupations waste the lives of children and of adults in the course of plans of men, it does not seem so cruel as when God does it in His plans. Perhaps it is profane to question the cruelty of nature, even though your heart swells with pity for flippant human life on the street. You understand the plan of a manager in industrial undertakings. The reasons for his economies and waste are evident. In nature we do not see the plan so clearly. We assume that large economy must be the ultimate aim, but on a system which allows great waste of human life and soul.

As one walks down Broadway at the present time he notes how rapidly decadence of morals and of taste are under way, as compared with twenty-five years ago,—keeping step with physical decadence. When we were boys clowns were the only folks who painted their faces grotesquely, but now a large number of the women who are supposed to be respectable, as well as those who are supposed not to be respectable, do to their faces about what the clowns did to theirs when we were boys.

In our everyday surroundings art fails to attract like nature. Take this question of cosmetics. A touch of pink for the lips, a bit of rouge for the cheek, some white for the shadow of the neck, something dark for the eyelashes. There now! Isn't that nice? No, it is not! Compare it all for a moment with the beautiful angelic light in the eyes of a young mother when she presses her new born babe against her breast. That is something worth going a long way to see. Is the artificial make-up attractive to men? No, indeed. They are afraid of disarranging something by a sudden move. Why do women use cosmetics? Oh, I don't know! Perhaps the manufacturers make money enough to allow them to advertise. Advertising would sell brass devils for lares and penates. It pays. In the faces of men whom one sees on the street, how few there are to-day who carry the expression of high thinking and right-mindedness, as compared with the men whom we saw even so short a time as twenty-five years ago.

Search Fifth Avenue for descendants of the strong Aryan race which came out of the mountains of India and swept as far west as to America before its blood became so thin that microbes got into it freely.

The champagne life of ease leads to defective progeny, the insane and the workless,—through no fault of their own.

Oatmeal and the struggle to obtain it give strong progeny.

The unemployed drag heavily upon the employed while the former are on the way to the bonfire which is lighted by gregarious instinct. The unemployed are largely physically ill, and the proportion of the unemployed in any state is an index of the degree of decadent tendency. The economic loss of their labor is very great, but broad human sympathy includes them among the ill.

A friend of mine who came to New York to sell some thoroughbred horses took a walk with me down Fifth Avenue.

He asked about the occupation of various acquaintances whom I met and saluted, often telling him they had no occupation. "What!" he exclaimed, "highly bred, and no occupation? Highly fed and no occupation? Well, I don't know how it works out in New York, but if I were to put my thoroughbreds in a paddock and give them all the oats they wanted and nothing to do I know just about how they would act."

Nature caused crowding in the cities by purposely giving *Homo sapiens* gregarious habits. Incidentally she lessened marriages because of the high cost of living which followed. She thus used the bonfire in no more cruel way than she did when directing the white man to use up the Indian, or directed the Indian to use up his neighboring tribe. Human life is simply one grand march around the bonfire, all people hand in hand, the weaker being thrown in as fast as they grow weary in the march.

In response to gregarious instinct people rush in an ever increasing herd toward the city bonfire. This may be one of the situations in which the Lord needs our help and would gladly avail himself of it. If that is the case, we may at least lend a hand by controlling the effect of this gregarious habit and moderating it. In the ideal state which is coming, we may send the farmer to spend a part of his year in the city, and the city man to spend a part of his year in the country,—both still actually engaged in producing. If every tired city clergyman would raise and fatten one hundred pigs during three months of vacation, he would gain in health, prepare better sermons, lower the price of pork, and increase his income.

In the greatest centres of congestion we find a greater relative proportion of people who are headed for the bonfire, this matter always seeming to stand in relation to the size

of aggregations. In a stable government, based upon observance of law and morals, we find a smaller proportion of individuals headed for the bonfire than we find in a community which seeks license in law and morality. The relative proportion of people seeking individual license represents the degree of decadence of any state.

Philosophers have traced the tendency of men toward collection in communities to an original defence instinct. This is perhaps true, but not in the accepted meaning of that expression. The city of amœbæ, of which a man is wholly composed, seems to have been constructed by nature for purposes of defence against microbes. The later collecting of men in communities was sometimes for the purpose of defence against higher enemies (higher than microbes) but not always. It can hardly be considered in the light of a moving impulse at the present time, when cities are larger than ever before. In view of this fact perhaps we can go back of the philosophers, with an idea that collections of men for purposes of defence against higher enemies were merely incidental to occasions, and that a prior impelling force has been their gregarious instinct. This, apparently, has no more to do with defence of man against his higher enemies than it has with defence of rabbits, starlings, herrings, and many other gregarious species against their higher enemies. Gregarious instinct may be traced back to so many original causes in different species, that in the case of man we need not hold to the theory of defence against higher enemies. I prefer to argue that gregarious instinct was given to man for the purpose of leading him in battle form against his lower enemies, the microbes, with a distinct understanding on the part of nature that warfare to a finish was the object. Man and microbe were to be brought together in battle array for the purpose of obtaining prompt results in trying out respective

degrees of strength. It is in the cities that one finds rapid development of our species up to its limitations, followed by rapid decadence and elimination of the ones who are not best fitted for survival.

I wish to recapitulate for a moment in order to get certain loose threads in spun-yarn form.

When certain species of animals like rabbits and lemmings increase beyond the limit desired by nature in any locality, epidemic diseases suddenly appear and stop disturbance of the balance of nature. This occurs regularly where nature has developed both enemies and victims in the same locality, but when an animal like the rabbit is transported to a distant country, nature may not be able to limit the increase and it becomes a very destructive agent. In the earlier days of history (to-day also) the human species was subject to epidemics similar to those upon which nature depends for limiting increase of other gregarious species. It seems to have been nature's plan to allow the medical profession to take charge of this subject up to a certain point, but there are limitations which we may not be allowed to pass. There appears to be a plan for destroying by poison various species of plants and animals which have arrived at stages of increase or development beyond nature's liking, even before their protoplasm becomes senescent. Almost every animal and plant not killed by a higher enemy is killed by the microbes which apply poison. There are few exceptions to this rule, although a natural element like fire or water may accidentally do the work which is systematically done by the microbe.

Concerning the stage of development which is to be allowed for man, we can no more anticipate the limit than we can anticipate the number of new suns which are to be formed in space. We may simply observe the fact that an oak tree is

not allowed by nature to grow beyond a certain height. A rose is not allowed to progress beyond certain stages of development, after which its stamens are transformed into beautiful petals and it falls a prey to enemies. Man, together with animals which he has domesticated, and plants which he has cultivated, when carried to higher stages of development, begins shortly to show stigmata of decadence, indicating that nature is setting her cultural limitations for him. At the present time there are few individuals among men who do not show some of the stigmata of decadence. These may be no more than irregular development of teeth or abnormal shape of toes, yet such minor abnormalities of small consequence to the individual, are of much significance as signs indicating the direction toward which an individual is being turned by nature. External anatomic defects are clearly in evidence to a greater or less extent in practically all individuals in any human community. We have to assume that glandular structures, which have for their function the manufacture of protective elements against microbes, present quite as many defects as may be observed in external anatomic structures. Structure and function are so closely allied that decadence of manufacturing organs means loss of some of their efficiency in protecting individuals against microbes. The higher our development, the greater our vulnerability to microbes of various kinds. These two conditions maintain a fairly even ratio one to the other. A poisoning process takes place in plants and in animals when decadence begins; and the degree of poisoning bears relation to the degree of lessened efficiency of protective organs.

It is nature's way, then, to destroy organisms through the influence of microbes with their poisons, and incidentally to increase the struggle for existence, causing forcible evolution through the influence of microbe toxins upon all cell aggrega-

tions (man for instance), which are built to resist the microbe within certain limitations. Microbes which formerly caused disastrous epidemics, attacking practically all types of individuals of the human species, are under excellent control at the present time in civilized countries through the resources of preventive medicine. Endemics like tuberculosis are controlled to the point where only those individuals who have passed the higher stages of development become particularly vulnerable. The word "endemic" is here used in its common meaning, but it has to be arbitrarily applied, because many species of bacteria which are insidious in their method of attack still conduct nature's plan of poisoning off excess of population, without making their presence known in symptoms of what we have called "diseases," as a matter of convenience in nomenclature. The colon bacillus group of bacteria stands among the most active of the microbic malefactors (malefactors from our egotistic point of view, benefactors from nature's standpoint). This group will perhaps be found to stand next to the tubercle bacillus group, if not taking first position, in the proportion of deaths which it causes in a community, although it has been mostly overlooked up to the present time. The colon bacillus group of bacteria has even been found to extend beyond animal prey in causing the destruction of terminal buds on cocoanut palms far above the ground and of onions beneath the ground. The reason why the activities of this particular group of bacteria have not been more quickly recognized is in general the reason why the flying machine was not invented earlier. A special reason is that methods of search for the colon bacillus are of recent development and not yet forming a routine procedure in laboratory work. The reason why routine procedure for looking after the colon bacillus has not been followed until very recently is because nature did not wish to allow us to make such

advance previously. Still other microbes may be found to be still more important later.

What would be left for the scientists of two thousand years from this present July if we were to settle all questions which might engage their interest? We must not only leave something for them to do, but as a matter of fact the scientists of that day will have so many more vistas open that scientists of 10,000 years from this July will look upon the scientists of two thousand years from the present time as ignoramuses.

There are few cases of so-called dyspepsia which are not influenced by the colon bacillus in near or in distant relation. Dyspepsia may be very near to direct colon bacillus influence when the patient has gangrene of his appendix, and very far from direct influence when the colon bacillus sensitizes the tissues of a parent to the point where a child has an arrested development of ductless glands, which control the secretion of hormones for carrying on digestion. The influence of colon bacilli stands between these two extreme positions when it causes arteriscleroses and high blood pressure through the influence of its toxins in sensitizing the blood vascular system in such a way that its innervation makes exaggerated response to the influence of epinephrin, or other internal secretions of the adrenal group. Sometimes the colon bacillus causes pancreatitis leading to diabetes mellitus. Sometimes it causes hepatitis; sometimes anemia simulating pernicious anemia; sometimes infections suggesting malarial infections. The colon bacillus often causes nephritis. At the present moment I believe it to be the most active factor in causing ulcer of the stomach through the influence of its toxins in causing proliferating endarteritis and closure of small terminal blood vessels of the stomach and duodenum. We know that many other excreted poisons cause ulcer of the stomach and duodenum. The toxalbumen resulting from a burn of the skin,

and the toxin of *Streptococcus viridans* have been made to cause such ulcers in laboratory experiment. The colon bacillus extends into the uterus and gives rise to acute and chronic infections, beside causing sterility on account of highly acid by-products. In many cases of infectious and contagious diseases like scarlatina, measles, typhoid, and diphtheria, this bacillus introduces the fatal feature through its influence upon the kidneys and other organs. It sometimes causes local pulmonary consolidation and has been found as the dominant species in some cases of purulent bronchitis and of lobular pneumonia. Schotmüller has recently shown that in fifty cases of herpetic fever the colon bacillus, mostly in pure culture, was found in every one. The cutaneous lesions are not confined particularly to any zone of innervation, although in many instances the eruption corresponds to the various branches of the trigeminus on both sides. We do not as yet know why the face has a special affinity for toxin of the colon bacilli. The fact of herpetic eruption occurring over the distribution of the trigeminal nerves would seem to indicate that these nerves, which have only a partial connection with the sympathetic system, lose control against the influence of the special toxin more quickly than if they were sympathetic nerves wholly. When herpetic fever occurs with ulcer of the stomach, it is probable that both mucous membrane lesion and skin lesion are rather closely related both in the nature of their toxic origin and in the character of their superficial effects.

There is no room in these notes for including all of the recently discovered influences of colon bacilli, but enough are quoted to show that it probably ranks along with the tubercle bacillus as one of nature's chief agents for preventing overpopulation and for regulating the character of population. Darwin and Malthus might have arrived at very different con-

clusions relating to the struggle for existence or the question of over-population had they been in possession of our present data concerning this single group—the colon bacilli,—which form in fact only one group of many which are producing influence upon various phases of organic life. Study of the influence of toxins of the colon bacilli upon the mind, directly and indirectly, is to be a feature of the twentieth century method of work.

Is there such a thing as the evolution of disease? Are there now really new diseases, not newly discovered and classified, but new forms which never existed previously? It is probable that new forms of old disease may arise, for the reason that bacteria themselves are subject to the laws of mutation. The establishment of a new variety of a species of bacterium would naturally have a tendency to change the character of the disease which it causes. We have to consider at the same time the question of mutation occurring in the body cells of animals. An established variant type of a species of microbe when attacking an established variant type of a kind of body cell, might give rise to pathologic symptoms which would not quite correspond to the symptoms that are caused by warfare between the original type of bacterium of that species, and the original type of body cell of that kind.

If we are to assume that new forms of organic life may possibly appear as simple cells which cannot meet resistance, and that the microbes represent definitely evolved forms of organic life, it is probable that we do not have at the present time any new diseases. Old diseases may fluctuate greatly in their frequency of occurrence, owing to the varying conditions of resistance which belong to changing environments. The American Indian is particularly susceptible to tuberculosis. In other words, the microbe of tuberculosis wages unequal warfare with the amœbæ (the cells) of the Indian because

the amœbæ which are engaged in this contest have not been trained through ages to meet the microbe of tuberculosis. This fact opens a question if the Indian and the bacillus of tuberculosis were not evolved upon different continents. At the end of a few thousand years, possibly of only a few hundred years, the body cells of the Indian might be enabled to meet the tubercle bacillus with their own weapons quite successfully, if the Indian were to remain with us.

Are there diseases which reach a certain point in development and then wane without the intervention of medicine or of external resources? Yes, cholera for instance. When a "family" of cholera microbes starts off into active proliferation the protoplasm of this family becomes senescent in a year or so and the epidemic ceases. In all probability there is a tendency for any disease to reach a certain point in development and then wane. This occurs through the rise and decline of protoplasm of a "family" group of microbes, and also through increased resources of body cells which have learned how to meet the microbe with their antitoxins and allied armamentaria.

When speaking in this way we assume that practically all diseases are due to microbic influence, excepting in cases of mechanical or chemical injury. If one were a purist, he would turn this question round about and say that all disease is of chemical origin, including grosser mechanical traumatism as well as delicate toxic traumatism. A toxin which bangs into a single cell and disarranges its molecular machinery produces a traumatism quite as definitely as a bullet produces a traumatism when it pierces the liver. A bullet could not pierce the liver excepting for the influence of a preliminary and contributory chemistry. Anyone who tries to head off any question and prevent it from running to infinity will have only a laugh for his pains. Any judge who tried to define

"accident" for the insurance companies would have a merry time indeed.

It is possible that new and dangerous microbe forms are developing while older forms pass through their stages of decadence and disappear. This, however, would be opposed to my hypothetical proposition that primitive cells once met primitive microbe enemies in nearly equal combat, but more highly resistant organisms now meet more highly resistant microbes. Victim and enemy have developed side by side in the course of evolution. The "popular" feeling that new diseases may be developing is probably based upon superficial observation. When the diagnosis of appendicitis was made frequently in a few localities in the early nineties, and was seldom made in other localities, it indicates the nature of view which we may take toward the question of new diseases. Appendicitis was thought to be especially frequent of occurrence in the few localities in which it was first recognized freely. In less than twenty years we have learned that it was one of the commonest of old diseases in all parts of America,—but unrecognized! We knew very little about systemic blastomycosis until very recently. When the diagnosis of this very fatal disease was made freely in Chicago, a feeling got abroad that it might be a disease of rather local occurrence. Reports which are now coming in from other parts of America indicate that it may not be a particularly rare disease. The same thing is true of sporotrichosis. When these two "new diseases" are recognized regularly by members of the medical profession doctors will wonder what they had previously called cases of these diseases in former years. The diagnosis of "tuberculosis" and "syphilis" cover a multitude of sins of omission in diagnosis, and have perhaps been made to cover a good part of the cases of blastomycosis and sporotrichosis.

It is probable that a species or variety of microbe, like a species or variety of man, may remain latent for centuries. When conditions have favored the loading up of the protoplasm of any one family group with a variant degree of energy, this variant family goes on to a remarkable expenditure of its protoplasm in the form of an epidemic, until senescence of protoplasm occurs. The species of microbe or of man remains the same, but a varietal variant family has expended its peculiar charge of protoplasmic energy in the form of an epidemic of microbes or of men. We are not to forget that an active nation of men constitutes an epidemic quite as much as an active invasion by the cholera microbe constitutes an epidemic. The destructive influence of any epidemic of men in relation to nature's resources is always greater than the destructiveness of a cholera epidemic, because man, with his higher intelligence, burns the forests, pollutes the streams, exhausts the soil, and lets the humus run off to the ocean. He kills off the wild birds and animals and his fellow man, and leaves in his trail a wake of poverty for others who are to follow him. "After him the deluge!" Ask the God of the Bison if man is not an epidemic. When senescence of protoplasm of a family group appears (fall of Rome—cessation of cholera epidemic) the remnants of a family may remain latent perhaps forever. Meantime some new variant family starts off upon an exhibition of its variant degree of protoplasmic energy.

In the higher culture of people we see the same effects as in higher culture of animals. As a matter of comparative sociology a thoroughbred horse may require the constant attention of one or more grooms detailed to take charge of him, all of whom have difficult work, while any one groom might take charge of a dozen horses of good exemplar type,

with less trouble. Perversions of natural instinct are common among thoroughbred horses.

As a result of culture, the white Leghorn hen rises to great heights of genius in egg laying, but how many chickens will she hatch if the matter is left to her own choice? Not one! She then is worthless as an example of high development, so far as propagation of progeny is concerned. She is only valuable for man's uses in a special way. Perhaps the ruler of this universe wishes to use up man through high special development of the genius, for His own purposes, while Antecedent Mind has still greater plans.

In so-called highest development of the fowl we really have a decadent manifestation, because if the hen does not sit upon her eggs it represents a high degree of culture, but no chickens are to follow.

Many wild animals when removed from their enemies, given all the comfort they wish, and having the struggle for existence removed, destroy their young which are born in captivity. Some of them will make no attempt at breeding. Nature ends their race by a very quick process. In other forms of animal life the process is slower though not less certain.

The habit of many wild animals when in confinement to stop breeding, or to destroy or abandon their young, seems to be a response to intuition, telling the parents their race is not adapted to the conditions of cultivation. There seems to be a demonstration of the same sort appearing in our more highly cultivated animals when they destroy or abandon their young. We observe then only degrees in the time of response manifested in such acts of various animals, rather than difference in kind of response.

As for man, look at the apartment house—which is built without accommodations for children. A vase for doubling

roses in theme, quite as clearly as a cathedral is for purposes of worship in theme. The inhabitants of the vase are social, entertain each other, and many represent high culture, but they add little or nothing toward permanence of the race. Nature's index of the rapidity with which decadence is progressing will be shown by the number of these vases for double flowers in our cities.

Just as the cathedrals were built for glorifying God, so the architecture of the cities now constructs beautiful apartments as vases for doubling rose with no place for children. These vases glorify the idea of culture, with elimination of the race. Their penates carry no inspiration of home and family. Many of the most beautiful apartments are planned only for those who have ceased propagation of their kind. They are meant only for double roses who are about to end their lineage.

In the Fifth Avenue district, where people have abundant means for educating their children, they have few children to educate. If one were to take the positive sign of the Jewish signs on Broadway and the negative sign of the number of children on Fifth Avenue, they would represent perhaps two extremes, but allowing one to arrive at a mean conclusion, for purposes of augury. A large number of the Fifth Avenue district houses are almost as silent as tombs. They are tombs, —tombs of the family and race. Go a little farther East to Madison Avenue, and one will find a few more children,—on Lexington Avenue more still,—on Third Avenue plenty of them.

A maid in quest of work was asked if she had much experience in taking care of children, to which she replied, "No, ma'am, I always worked for the very best families." According to a report by Dr. De Blois, three-fourths of the homes of wealth in Boston's fashionable district are childless; but in the fashionable district in St. Louis, only one-fourth

of the homes are childless. This corresponds to the general statement that the localities representing the highest degree of culture give ample testimony in support of the law that the logical end of culture is elimination of the race.

Nature has to daze the boy and the ruffed grouse with *wanderlust* in very much the same way as she dazes the lover with a psychosis, in order to carry out her plans.

Wanderlust is one of nature's means for ensuring distribution of population. The boy running away from a good home unaccountably, can give no reason for his action. The ruffed grouse flies far from its covert, and perhaps dashes through the window of a house. A boy and a ruffed grouse both seem dazed while under the impulse of *wanderlust,* and it evidently dates back to a plan of nature for securing distribution of a species.

The maiden who is unmarried because of the influences of culture under conditions of peace in any country, is in a similar plight with the maiden who is unmarried because of tragic conditions of war. If we speak in terms of cruelty, both conditions are equally cruel. If we speak in terms of quantity, both are about equal in numbers. If we speak in terms of nature's plan, each example is equally significant.

The army and the navy take a great many of the best breeders out of a nation, because marriage is inconvenient in the profession of arms, and men who are slain represent those who are physically the best. Culture destroys the best breeder under influences of peace.

The Chinese instinctively prefer famine and plague to war, as a means for reducing over-population.

Prognostication concerning over-population is subject to change owing to the introduction of various factors belonging

to kaleidoscope changes which are constantly taking place, and not anticipated. About seventy-five years ago Karl Marx predicted the rapid disappearance of the middle class. It didn't happen. Nature trims off the extreme classes and makes a favorite of the middle class—the exemplar class. It is now time for us to take up the role of the microbe in this relation and systematize eugenics. The insanity prognostication made by students of the subject at the present time, may lose its mournful sound very rapidly in the majestic din of these epoch-making times. They have told us that in one hundred and fifty years there will be one insane person confined for every one who is free to take charge of him, if the present rate of insanity continues. Right now the study of the microbe in its relation to insanity may break the entire line of superstition and tradition upon which psychiatry itself has been based.

One manifestation of doubling of the rose is in the rapid increase of insanity. The proportion of confined insane in the United States is now eighteen hundred to the million, three times as large as it was fifty years ago. The proportion of moral defectives, not quite in the insane class, is increasing in the same proportion. Another evidence of race decadence is the increase of incompetent mothers. At least one-fourth of the mothers in New England are unable to nurse their babies, and bottle-fed infants do not have nearly the chance of children who are nursed at the breast. Arteriosclerosis or degeneration of the blood vessels is increasing at a dangerously rapid rate, and it is a complication apparently due to decadence of the protective organs.

Figures compiled by Frederick L. Hoffman, of Newark, N. J. (life insurance statistician), taken from one hundred small cities in the United States, show that twenty years ago the rate of suicide in these cities was 12.8 per 100,000, but

in 1911 had increased to 19.8 per 100,000. Three men destroy themselves to one woman. The reasons attributed to suicide were mental derangement, nervous diseases, alcohol, sorrow, and physical distress, in the order named, but these can probably be mostly classified under decadent loss of efficiency of protective organs. Socialism is offered as a panacea to cure this serious social illness. Various "isms" are put forward as remedies, but it seems to me the subject is not one to be treated by sociologists. It is a subject which properly belongs under bacteriology. It is the bacteriologist who must discover causes and find ways for prevention, before attempting to study the economic problems associated with it. Sociologists will differ as to the ethics of self murder. Psychologists will disagree about the psychological features. Bacteriologists will differ concerning the microbes which are involved, but will arrive finally at conclusions of practical value because they eschew metaphysics.

Suicide will increase in every country in proportion to the number of people who suffer from the effects of arrested development of protective organs which are employed against microbes, and this can never be wholly avoided because it belongs to nature's plan.

The heading of an article in to-day's paper by a noted psychiatrist reads, "As woman advances, the suicide tendency grows." These are parallel facts, but casual,—not relative. The author of the article misleads by special pleading. Such a fact does not relate to women more than it does to men.

A recent observer reports in the Journal of the American Medical Association the finding of evidences of *status lymphaticus* in about 30 per cent of suicides on *post mortem* examination, but does not agree with some authors who believe that it is best not to attempt the control of suicide, on the ground that it eliminates the unfit. In a goodly percentage of cases,

the individuals with *status lymphaticus* may accomplish remarkable results of value to civilization, even though they may not be of service for continuing the race. Further than that, a large percentage of those with suicidal impulse who do not have *status lymphaticus* may be pretty normal people, but suffering from some transitory toxic influence which is quite remediable.—toxins of various bacteria have perhaps been allowed to grow because a man has not built up his physical condition sufficiently well for disposing of such bacteria. As intoxication increases he becomes more depressed daily. Almost any one with ideas of suicide presents a psychosis which is commonly toxic, as we already know. The toxic feature is well understood by doctors in relation to a certain number of these cases. If any such individual is taken into the woods, given a sufficient number of hours' sleep and exercise, his interest engaged in following some occupation like the collection of certain natural history specimens, or good fishing or shooting, the lust of the chase may allow him to return in a month or so in first rate physical condition, and quite amazed at the idea that he had previously considered any idea of suicide. Sometimes mental shock or physical shock lessens the manufacture of protective cells against bacteria for some individual, and a dangerous mental condition follows promptly.

Suicide does not belong much to people who are engaged in useful occupation for others, even when they are mentally ill. Self and self only is in the mind of the suicide, a morbid manifestation of the instinct of self preservation which has become changed into an idea of self destruction, very much as love becomes changed into hatred.

As different nations reach their cultural limitations intended by nature, the birth-rate drops. This occurs during

the reign of E the Third. E the First in the life history of a nation is Establishment (through force). Then comes the reign of E the Second, Expansion of mind (remarkable progress in science). Following this period comes E the Third—Expression of spirit in highest degree (art and literature). Then comes decline. France has been the first to present this tendency among highly developed modern civilized nations, then Germany followed, and now Austria is showing a rapidly falling birth rate. England will go down with flying colors following her periods of Establishment, Expansion and Expression. Russia as the country which is to dominate the world in some near century made a showing in the 1900 report, of a birth rate of 17 per thousand over deaths. Germany 11.3, Italy 10.1, the United States 7.5 and France 0.9. Since this census report was made, Russia has progressed in newer sanitary science to such an extent that her birth rate is rapidly becoming progressively larger in proportion to the death rate, while Germany has had a greater proportionate drop in birth rate than any other civilized nation during the same number of years.

Cessation of the government sale of liquor in 1914 may have the effect of placing Russia quickly in the lead as a new nation of enormous and unknown potential.

Lively response was recently made to a published statement that Vienna was dominated by neurasthenic influences. Vienna is not different from any of the old capitals in this respect. New York will follow in due course of time. Capitals must all become dominated by, or at least largely subject to neurasthenic influences, according to the laws of protoplasm. In this country the oldest cities will first give an exhibition of double roses at a time when newer cities are demonstrating the crudities of culture which belong to a more vigorous outer ring of newer protoplasm. As years pass these two influences

will overlap. Nations one after another develop their double roses, and one by one they drop out, to be succeeded by better breeders. We are not to be alarmed at this conquest. Bacteria are the best breeders of all,—consequently they will persist as winners.

With roses as with nations certain kinds begin to double much more rapidly than others. *Rosa rugosa* has a tendency to begin doubling very early under cultivation, while *Rosa blanda* persists for a much longer time without doubling.

France is one of the grandest of nations, now nearing its end with the great bonfires blazing aloft in the cities, and fed ever with the waste part of new material from the provinces. After a brief period of increased useful activity in the cities, the Elim begins to read literature of modernist novelists, laughs in despair, and hurls himself into the bonfire, to be replaced by others from the provinces. New unspoiled citizens are constantly arriving from the good soma cell and germ cell regions, where the microbe is still obliged to remain in a comparative degree of subjection.

The brilliancy of dying double roses in France, together with the strength, ignorance and fecundity of simpler French types which have been transplanted to Canada, give an impressive object lesson. The object lesson seems to indicate that a business man in charge of the world could perhaps make France dominate all other countries. Nature takes the matter in charge, however, and does not allow any such thing to happen at present. She wishes to try out hundreds of other nations in the next million years and observe what they will do when left to their own resources. The nation capable of managing its own affairs in a way for winning will be the pet.

Lower the cost of living! There is only one basic way for

lowering the cost—raising more of the useful things. In an over-cultivated field weeds come in and good crops grow no more.

All centres of doubling roses are fertile fields for the weeds of culture. Fanciful religious cults, like weeds, find the right sort of soil, for instance, in Massachusetts, where we have an old civilization.

America will make more rapid progress than other countries have made, because of our nervous tension which causes more rapid doubling of our flowers. This will bring about the inevitable end sooner.

I cannot imagine a series of conditions which will prevent New York from having the final history of the City of Rome unless we awaken, study the microbe, and act in accordance with our new knowledge.

The constant demands upon sociability in the city make it difficult for men to devote themselves to questions involving deeper ranges of thought or of feeling.

There is one very strong check used by nature for preventing too rapid progress, and that is sociability. Men are invited to stop work and to enjoy sociability. One of the great painters who came into a fortune told me that it was impossible for him to do any further work of any account. He could not escape social engagements and find himself alone with the muse. In addition, his sympathy was engaged by struggling artists, and he had to expend his sympathies among them rather than in expressions of deep feeling with his brush. I mention only this one instance as characteristic of nature's way of keeping things in proper proportion, of preserving a balance.

If insects increase in our orchards with which we disturb the balance of nature, it is not meet for us to complain, because

we upset the balance ourselves, and bring about the consequences by giving parasites a choice collection of their prey in orchard form. When people collect in orchard form (cities), the microbe increases for precisely the same reason.

Nature says to the oak tree, "You have managed your protoplasm up to the point of growing eighty feet in height. Now I shall break down your protoplasm faster than it is built up, I shall set on the microbe, now that you have reached the limit that I decided upon for oak trees." She speaks in the same way to every species of plant or animal.

If the top of an oak grows too rapidly for its trunk diameter or for its roothold, every passing wind bends it dangerously, or even disastrously. It is the same thing with knowledge or anything else growing and developing. All parts must be kept in harmonious proportion.

There is danger in making progress too fast along any line of study. Professor Thurston told me that he was present in an audience of scientific men, when Zalinsky, describing the employment of dynamite for projectiles, wished to show that it could be burned without detonation. He put a stick of dynamite on a platter and set it on fire. It burned in a harmless way. Now he had made progress up to the point of giving that demonstration, but he was making progress too fast, because he used an earthenware platter for the stick of dynamite. Supposing that under the heat generated by ordinary combustion of dynamite, the platter had cracked. Detonation then following would have killed most of the men in the room.

The great intuitions would lead us too rapidly into the secrets of nature's plans. Consequently a number of small interfering intuitions make a proper degree of obstruction, although they all belong to the same species of Homo sapiens.

A duck walking to the water with her peeping downy brood will continue straight toward the water, even though her little ones get in the way and impede her progress, but all are ducks nevertheless, and all are bound for the water eventually. Our intuition in regard to a future life bears strong evidences of being correct. A woman's first intuition in regard to a man's chief characteristics is apt to be correct (in advance of the love psychosis), no matter how much she may modify any subsequent footsteps by her small interfering intuitions belonging to daily life,—some going backward and some sideways.

We make progress slowly. Designers have not as yet learned to take up the diatoms for a study of their beautiful lines and figures which are endless and entrancing. Mud will have a great charm for everyone when designers go to the mud with their microscopes. Then indeed shall we have something beautifully original and new!

If our young men who have wealth and spare time were to devote themselves to science, our oak tree would grow too fast. Consequently nature sees to it that their money is wasted for the most part. The advance in value of Calumet and Hekla mining stock held up a great deal of scientific progression in one city where learned men happened to be investors. Incentive to work was lessened.

The reason why knowledge and wisdom and experience cannot be passed on from father to son is because the world would progress too fast. Think what could be done by the wisdom and knowledge and experience of a successful man, eighty years of age, who could transmit that force in full to a son just entering upon active life. We die just as we become most wise. We are in the embryo stage like tadpoles and salamanders for a long time. It is nature's plan to keep us tadpoles in experience until midlife.

In the years of a young man's greatest physical possibility for activity and usefulness, he may not be very busy. This is another one of nature's plans for preventing too rapid progress.

Everything rushes to the overthrow of a man who is making too rapid progress, in a football game, a business, or a profession. Strong efforts are brought to bear against the man who is going fastest with the ball. Efforts of other nations are directed in a repressive way against a nation that is going fastest.

The yellow journals assist in elimination of the unfit by making a feature of suicide, murder, mystery and crime. Through repeated suggestion, weaker natures follow the suggestion, and go into the bonfire. The yellow journals then are beneficial according to nature's plan. In fact, we find that everything called injurious is really beneficial, if we view it in a large enough way. When Peter the Hermit led his thousands to where they were murdered,—there was a fine clearing out of the excess of credulous neurotic fanatics.

One of nature's ways for preventing too rapid progress, is in giving property a greater value than human life. The study of eugenics therefore was developed first on the stock farm and in the orchard. Fruit orchards are abandoned because of increased difficulty in meeting enemies which increase under conditions of cultivation. Precisely the same thing will occur in cities, the difficulties finally becoming so great that only the most expert citizens in the city and orchardists in the country will be enabled to meet the microbe on its own ground successfully.

Just as nature tries out nations and races, so does she try out families, carrying them up to cultural limitations, finally developing a few individuals with talent or genius, and then disbanding the family with neurasthenia.

The descendants of the signers of the Declaration of Independence were very strong for awhile, as were the descendants of the signers of the Magna Charta of England, but only a few of them now have a leading influence in affairs.

A family gaining culture along with physical strength in good normal proportion goes to the city, makes a display in expression of talent or genius for a couple of generations, and then the inert residue of the family becomes a public charge or goes back to begin all over again upon the land.

Plenty of money is always forthcoming for fad promoters, because they engage the interest of Elims who represent the ends of families. The ends of families are apt to have money for the same reason that resin collects at the base of a dying pine tree. It is inspiring to note, however, that large as some of the gifts are to fad subjects, immensely larger endowments are at present being made for substantial things in science, in art and in literature and education. This indicates that on the whole decadence ends by triumph of the family in its actual influence upon civilization, even if the family itself must go. The pine knots that are left give bright light for guiding the world on the whole, and we need not mind the smoke of bad endowments. The balance of nature when felt in this field, shows that nature on the whole wishes to have movements extended in lines of progress.

In the twenty-first century we shall not boast of what the father and grandfather did so much as we shall speak with pride of what son and grandson fairly promise to do upon the basis of our new methods in training.

Up to the present time men have been inclined to boast of what their ancestors were, rather than of what their descendants are to be, but eugenics will change all that in the twentieth century.

Skilled physicians are now raising unfit children in a pro-

portion never known before, and if we are really to make any advance in the face of decadence we must have a perfectly clear understanding of this fact, and a hastening toward the system of eugenics. We are now frankly committed to a policy of saving the unfit—skilfully, and proud of that skill.

Active study of the factors of physical degeneration is the line which education will follow in that nation which is intended by nature to dominate. The distinction between moral health and physical health is not made crudely to-day as it was in former times. We are getting to know that there is hardly any moral disorder which does not depend upon some physical disorder. The only way to strengthen healthy instinct is to strengthen the body which furnishes that instinct.

Our responsibility consists in improving the quality of the race up to the point where the rose begins to double. Under present conditions, we help the unfit to compete with the fit, encouraging the unfit to propagate their kind.

When a doctor speaks of the unfit, it is with a feeling of deepest heartfelt sympathy. Among his patients there are many who shed bitter tears whenever they hear or read that phrase. Some of the cleverest, dearest, most useful, most cultivated among his friends burst into tears in his presence. They bury their heads between their hands and say in the midst of sobs, "Oh! doctor, I know that I am among the unfit. Whenever I read the terrible words or hear them spoken, they go straight into the centre of my heart. They seemed to be aimed by you healthy strong people with an air of nonchalant spirit and with a suggestion that somehow in one way or another we ought to correct ourselves. We cannot do that. Have pity! Remember that every time you employ the expression publicly it causes pangs of anguish for somebody. You cannot understand. We understand."

CHAPTER IV

What about the future? We may judge from the past. Tribes will destroy other tribes, nations will destroy other nations,—the process will continue, and war will not cease. It will be longer postponed among the more civilized nations because the "international mind" of Dr. Butler is already growing out of the international counting house. That is the first step toward an international mind in other affairs. The channel of trade is the sap channel. Primitive plants had to develop slowly to the point of establishing sap channels, but these had been ordained by nature, just as the counting house had been ordained by nature to appear in the course of evolution. In plants, positive and negative pressure are required for distributing nourishment. Among nations the positive pressure of credit and the negative pressure of debt will establish normal flow of good international mind. It will become economic policy for nations occasionally to agree upon disposing of some one nation that becomes profitless through decline.

Under conditions of peace more and more doubling of the rose will appear in all civilized nations. If this proceeds to the point where all of the present civilized people are much weakened, nature will wipe them all off, and begin over again with new nations. If nature intends to allow any of the present civilized nations to go on to the definite final destiny

of *Homo sapiens* (very improbable), the ones which prove to be the most resistant to those microbes which are responsible for doubling of the rose will be the ones to outbreed the others. Warfare with the microbe, however, will increase to such an extent that eventually comparatively few children will be born or will arrive at mature age. These few, representing the survival of the fittest, will be the last ones on earth.

The spirit of prophecy in olden times came to men in the desert or otherwise far removed from daily adjustment to the realities of life. Prophecy which was based upon free intuition and which obtained a wide hearing, has usually been half right at least, failing, like Spiritualism, only when it came to critical tests. We have now arrived at a stage in civilization which allows of prophecy being placed upon a more scientific basis. If one wishes, for instance, to foretell the fate of some country, England for example, he takes the question back to biology, and something after this fashion: That nation consists of aggregated masses of protoplasm. According to certain laws of protoplasm it first becomes generally senescent at the site of its early activity, in a nation or in a microbic test tube culture. In the case of ringworm the central culture of microbes reaches its protoplasmic limitations while the peripheral individuals are very active, but finally the family group comes to an end in the presence of increased opposition from body cells. The same thing occurs with a measles epidemic. It is the same way with any given variety of the potato. Similar history belongs to a herd of cattle. England will go down in the British Isles at a time when her newer outlying colonies are showing increased vigor. Canada, with its resources in land and sea ports, will be greater and more powerful than the present England in perhaps three hundred years, and will dominate our nation (an older colony) through supremacy in commerce.

This estimate is based upon protoplasmic prospects, on the basis of the idea that protoplasm will be left to grow wild, as in the past. If any nation cultivates its protoplasm intelligently, that will change the whole history, but in all probability nature is not ready to allow any one nation to do that as yet. She probably wishes to eliminate a large number of nations in the course of ordinary competition. The rapid development of Canada would even now be more rapid were it not for decomposition of character that is evinced in venal methods among some of its public officials. This is let us hope a transitory influence belonging to an imported contaminating influence from the mother country and from the older neighboring colony. The vigor of new well oxidized protoplasm will overcome in large measure such influences of decline as have been imported, by the time when the shores of James Bay and of Vancouver teem with agriculturists and seamen. Canadian commercial domination, reaching southward, will probably come into conflict with German commercial domination, extending up from South America, and meeting on the field of Mexico. As to Mexico itself, no prognostication can be made, because we are not dealing with a durable varietal group. Mexico will not follow the colonial ringworm law of protoplasm because its population carries such a large admixture of Indian blood, a cross between species. We are dealing with a temperament which manifests itself in love of magnificent power or in extreme indolent submission. The love of power, however, does not assert itself in Mexico through great undertakings in the constructive fields of art, science and literature, but in destructive martial efforts leading to personal supremacy of individuals. Mexico, therefore, will continue to rend itself, until the capital of other countries wearies and insists upon a *modus vivendi*. This will be a matter of international politics.

The disturbances in Mexico at present are like disturbances in Mexico in the past and like previous disturbances in almost every other country in the world. Every established civilization has been founded after men had cut and hewed each other into some sort of dominant type representative of the nation. Neither Toltec nor Aztec nor any Indian has been enabled to hew away discordant elements enough to establish in Mexico a lasting dominant type, to take its place among other durable nations. When the Spanish came in the name of the cross, they made crosses with all of the people then in Mexico, and that complicated the situation still further. In Mexico the specific hybrid consists largely of Aryan (Spanish) × Mongolian (Indian). Biologists have had specific hybrids under observation for a long while in the example of the Eurasian. An individual of the specific hybrid type apparently does not carry "a cenesthesia of similarity" which allows him to join easily in mass with his prototypes for purposes of mutual government. There seems to be a peculiar tendency to individual expression explosively or indolently.

If we may employ the hypothesis that man is a chemical machine, that one action of his chemistry is expressed electrically in neuricity, and that neuricity imparts an impulse to the ether in such a way as to cause response in what we call "thought," it is not difficult to understand why a specific hybrid expends thought energy in a way which is not characteristic of well balanced cell action belonging to established racial forms of man.

The specific hybrid may actually have some such material anatomical peculiarity as the possession of an abnormal number of sensori-motor arc synapses. The more complex these synapses, the less predictable would be the response of an individual to external impression. Psychologists have as yet

barely launched their exploring canoes upon the great flood of this new current of thought.

If our impatience over Mexican affairs finally arouses us to the point of insisting upon the freedom of that people from dictators, from corrupt courts of law, from theft of money appropriated for public works, from burdens which are placed upon the public in exchange for private concessions,—we might send to Mexico one of our own institutions which has been approved by a highly civilized free people, as indicated by their votes. The organization of Tammany Hall is complete as an organization. No revolutions take place within its ranks, and the disposition of capital coming under its control may be foretold, assuring a certain stability which appears to be attractive to capitalists. No one is likely to be murdered under this form of government, excepting those who threaten to disarrange the system of government, and while in the course of evolution there has come to be less fear of the Lord within its circle, there is a compensating fear of the dictagraph, which serves a more direct purpose in these practical days.

The protoplasm question would naturally bring Canadian and German elements together about the level of Mexico, by the time when both of these strains have about reached the limitations of their own protoplasm. If military warfare were still to be a feature of the times, the Slavs by that time would begin to run their protoplasm over the rest of the earth. If the Russian Slavs were to lose their tendency to decomposition of character among higher officials and become capable of government on a grander scale, they could overrun the earth easily, because their enormous oxidizing area, one seventh of the habitable globe, will allow their protoplasm to hold out for several centuries yet to come. It is possible, however, that the sap channels of trade will be so well estab-

lished by three hundred years from now, that military warfare between great powers will be practically abolished. Economists may impress the fact that no great country can afford to fight in a military way. This may leave the Jews dominant for awhile, because of their capacity in trade, capacity for government, and protoplasmic capacity under conditions belonging to the gregarious habit. The wide distribution of the Jews serves for them very much the same purpose as colonial or territorial expansion does for other races. This may have been nature's way for preserving a chosen race until the time had come for it to assume general control in its turn. The intellectual capacity of the Jew is such that he can take charge of the microbe question, and any race which can do that can conserve its protoplasm and begin the higher evolution toward more perfect development of man. The intellectual capacity of the Jew will allow him also to comprehend the destructive influence of decomposition of character, and he will fall back upon the moral traditions which were formulated by his people before the days of Christ and which have served all other nations since that time.

Decomposition of character in ruling circles has commonly gone by the name of "gentleman's agreement." Underhanded agreement has slipped the golden key stone of every fallen government in history, and will continue to do so until the chosen nation comes. Nature makes this supreme test of the desirability of any nation. She moves men up to positions of power, then leads them to an open gate which is kept open by an arch with a key stone of golden character. It is the key stone of service for others rather than for itself. Two or more individuals are required for moving the key stone. Two men or a small group make a "gentleman's agreement" between themselves to remove the key stone for the purpose of applying the gold to their own ends. Down comes the arch in any

country, in any profession, in any trade, when an underhanded procedure which goes by the name of "gentleman's agreement" occurs. Theft of the key stone allows the high arch to tumble and close the gateway to great freedom for a nation.

Judging from the present factors in sight, the Jews distributed among other races will continue to outbreed the other races. The international mind will then rest for awhile with the Jews in its highest perfection. Other people at present are being stripped away gradually but surely, and with a certain sort of precision, by the microbe. Nature probably has not as yet tried out all of the various races of *Homo sapiens.* Several strains may still be under observation. Now that tribal wars have been checked in Africa the horde of blacks would assume dominating proportions at least were it not for microbe epidemics and intellectual limitations of that species group. Although Russian Slavs are due to sweep over the other present civilizations in some future century, the Slavic sweep may likely enough come at a time when the Jews are dominant.

It is quite possible that Chinese races are being reserved by nature in preparation for occupying a ruling position over the earth at some time in the future. It was the philosophic belief in their own superiority which prevented the Chinese from adopting Occidental ways in the sciences as rapidly as this was done by the Japanese when the latter developed exoterically.

One reason why a country of scholars like the Chinese Empire does not progress in science is because the student is devoted to a study of the philosophy of the past. When obtaining what corresponds to a baccalaureate degree he has to memorize the ideas of the past two thousand years. Theology in the Occident imposes about the same sort of

burden, and it does not as yet fully realize that Copernicus and Galileo sealed the doom of the geocentric and anthropocentric theories many centuries ago. Many anthropologists have a conviction that an awakened China is destined to accomplish more than has been accomplished by an awakened Japan. Splendid new nations may come out of Oriental racial protoplasm. An awakened nation has the tremendous advantage of clearing itself from traditions and accepting the best that the world has to offer. If China were just now to grow in the sciences synchronously with other civilized nations, she would be handicapped by our present traditions which interfere with the best moral and physical progress. A few thousand years means so little in nature's plans, that the present Christian cultural period with all of its people may simply furnish interesting material for students of archæology, five thousand years from now. It may have been a plan of nature to spread the Jews through civilized nations, in order for them to absorb the values developed by others, very much as we pour quicksilver over various grades of ore in order to take out all of the gold. This would seem to be a tenable hypothesis excepting for the fact of there being so few Jews in China, constituting one of the most highly civilized groups of nations.

The most highly civilized nations which are nourished by the international mind, now that sap channels of trade are being constructed, will probably dispose of less civilized nations first, before eliminating any of their own group through warfare.

The God of nature gave to *Homo sapiens* the gregarious habit just as he gave it to the passenger pigeon and to the bison. Therefore all questions of primordial law relating to man must stand in some relation to that habit. The Jew survives better than the Aryan under conditions of this gre-

garious habit (under the present conditions). We therefore have in our proposition: (1) *Homo sapiens* is gregarious, (2) *Homo sapiens Judaiensis,* survives best in the flock, (3) other species and varieties in the flock die off more rapidly, *ergo, Homo sapiens Judaiensis* will prevail for awhile and will then take his turn in decline.

Nations with the greatest fund of physical strength are those in which women do physical work. Where they do not engage in physical labor, or its equivalent in exercise, toxic influences make deep impressions upon the protoplasm of the nation. Doubling roses appear. The nation makes expression of its chief characteristics, and then having been tried out by nature, begins to decline. Not all peoples, however, require the same degree of physical exercise for maintaining their standard of position in health. It is a relative matter. Thus the American Indians who require a great deal of physical exercise for their species of the genus decline much more rapidly when deprived of it than do the Jews, who, as another species of the genus require less physical exercise for maintaining a mean average physical type. While the Jews at present do not exist as a nation in a political sense they constitute a nation in biologic meaning and one of the most harmonious groups of people.

When Dr. Austin Flint stated that city-bred people usually become impotent in the third generation, his observation most likely referred to the class of people who made up his Aryan clientele, and I doubt if he had in mind the Jews, who often raise large families generation after generation under conditions of urban life.

Remarks quoted from an article on the subject of "Race Resistance" by Greeley in the *New York Medical Record* for August 10th, 1912, are to the point.

The last United States census gave the comparative number

of deaths for the year among each one thousand of the living members of the principal races in this country as follows:

FROM ALL CAUSES

AGES	NATIVE WHITE	COLORED	GERMAN	IRISH	SCAND.	ITAL.	JEWS
0–4	43.	118.5	47.6	56.1	37.	80.7	36.7
5–14	3.7	9.8	3.7	4.5	3.7	4.9	2.
15–24	5.	15.6	4.8	7.5	5.7	6.6	2.7
25–34	6.4	16.9	7.4	12.2	7.4	7.1	3.5
35–44	7.5	21.	9.6	15.	9.	9.2	5.

FROM CONSUMPTION (per 100,000 living)

0–15	27.5	246.	26.6	42.2	32.4	50.7	11.4
15–44	162.5	587.4	205.9	428.	233.7	149.9	67.4
45–64	131.8	518.	207.5	340.9	267.7	157.	103.9
65–	176.4	548.7	235.3	324.7	236.6	144.7	243.2

A glance at this table will show the immense difference between the mortality of the Jews and that of other races. Even the native whites, who undoubtedly live under better hygienic conditions than most of the others, have a death rate greater by fifty per cent. On that test basis of comparison, the resistance of Jews to tuberculosis,—the disease of all others to which the whole population may be regarded as universally and constantly exposed,—they show a mortality of less than half that of the native whites until beyond the age of forty-five years, before which period as apparent from the table the greatest death rate exists among the more susceptible races. After the age of forty-five years the Jew's comparative mortality from tuberculosis increases, and after sixty-five years of age surpasses that of any other white race. They are so resistant to the malady that when they do succumb it is much later in life, and their additions to population have then been made. It is known that the most congested districts in the city have the heaviest death rate. In the most thickly populated sections of New York and of Chicago the Jewish

death rate from tuberculosis is but 1.63 per thousand living, while the Gentiles under the same conditions suffer to the extent of from 4.95 to 5.65, fully five times as much. In Berlin this rate is: Jews 1, Gentiles 2.17, and in Vienna 1.31 as compared to 3.17.

In addition to lessened vulnerability to infections in the cities, the Jews also use less alcohol and less of narcotic drugs. This means that they are more normal physically than are people who use much alcohol and narcotic drugs, and who become consequently more vulnerable to bacteria.

If we note that the Jews are replacing other people in New York, the common answer is that it means nothing, because New York is a commercial city. But the whole of America is commercial in fact, and New York is simply representative. All cities and countries are commercial basically and finally. The Jews may be the next people to follow Aryans in the plan of nature, although Slavs would dominate before that time if they had leadership to suffice for the purpose.

The Jews with their splendid intellectual accomplishments were advancing so disproportionately to other people in the medical profession that nature became alarmed. She set the law of compensation at work, and put on the brakes by bringing in their commercial instinct. Fee splitting then caused decomposition of professional character among all but the best men among them. This so degraded and offset their splendid professional proficiency that balance was restored. Doubtless the Jews learned about fee splitting from Aryans and then excelled in the art.

When Jews become criminals they enter a high class in that sort of occupation because of the degree of intelligence which they carry into it. The question is often asked if there are more Jewish criminals than others. No! Statistics show them to be comparatively few. There are not so many in

proportion, but they are more conspicuous according to press reports, because of that high degree of intelligence which they employ in criminal work. If they specialize in fires, failures and smuggling, Aryans gave them first lessons. The reason why Jews are better than other people and worse than other people is because they are so intensely human. Christ and Fagin were both Jews.

When Aryans complain about Jews taking charge of certain industries, they must ask at the same time what Jews have done in the way of developing these same industries. If we speak of the large immigration of Jews we must at the same time speak of the immense work done by Jews in relation to the entire subject of immigration and labor. If we criticise their tendency to commercialize amusement, we must stop and remember what the Jew has done as a playwright, actor, artist and musician. In every country in which the Jew has a stronghold to-day, it is because of his ability to become an ally rather than an enemy of that country, and his patience is that patience which belongs to the Roman Catholic and to other diplomatists who have learned to know the end-results of persistent patience.

The Jew does not show, outwardly at least, that contempt for other people which is shown toward him by the more impatient men of other races. Did the five Rothschild brothers not have reason to hold in contempt the people of high social position in the five countries in which they established themselves,—and who made historical precipitation of character in exchange for money? The Rothschild brothers made no outward show of that contempt which they must have felt, but calmly and patiently made use of their opportunities, after the method of people who are serene and benign upon a basis of unquestionable stability and security. If we are inclined to magnify mean traits of the Jew we must remember that it is

a case of "diamond cut diamond," for the Jews are employing the very same traits in competition with each other. We must always endeavor to keep our sense of proportion and remember that Jewish noble traits are quite as much in evidence as are their mean traits, when applied in matters of human uplift, in morals and in commerce.

The Jews ceased as a nation a great many centuries ago, but continued as a race without that decadence which in history has ordinarily gone with national dissolution.

There are perhaps two good reasons why the Jews have not undergone the classical rise and fall of a cultural period. Their religion has a cohesive effect, and this is aided by the unifying force of external pressure on the part of other races with which they have become mingled. It is probable that the Jews if confined to one country of their own would speedily undergo development and decadence like other nations. The social prejudice against the Jew is an extremely refined sort of cruelty, because it is largely shown in high social circles, where lines are hewn with a politeness that presents a keen edge.

Were I a Jew I would hold my head high and make no social obeisance to the Aryan. I would allow no one to mistake me for anything but a Jew. We can see the weak points in other races of people better than we see our own weak points. A weak point in the Jewish race is commercial in its bearing. Instead of meeting the perfectly natural social prejudice with an erect proud defiance, or better—tolerance,—certain Jews who are engaged in commercial enterprises imagine their business to be injured through race prejudice. They change their names, or deny the fact of their race or religion,—and at the same time seek recognition on the basis that they are no longer Jews. This has the effect of making the prejudice stronger, because one is always suspicious of any sort of a renegade

whatsoever. When the Jew takes full advantage of the power of his intellectual history, points with pride to the fact that he is a Jew, and does not ask to join any social club of Aryans,—believing his own social club to be of equal or greater consequence,—the race will make an united force quite as strong as that of any other race at present on earth.

Can the Jew be controlled by oppression? No, it has been tried thoroughly. The rest of the world can retain domination over the Jew only by outbreeding him or by killing him completely.

Bergson believes that Jews will gradually become assimilated with other races, and that the melting pot of Zangwill is to furnish the eventual solution of their question. My belief is precisely the opposite. Varietal protoplasms may mix well, but not often specific kinds. The Jews have shown such tremendous strength in the past, that I believe they are destined to become one of the strongest races on earth. The more intimately they cohere in every way, the more rapidly will nature's law be carried out. The happy solution of the question to my mind, is not one of assimilation but of an alliance on such a very high plane—that two races may live side by side in constant contact with each other as allies. They can do this to far better advantage and with greater social dignity on the part of each, than when living under conditions where there is a suspicion that one wishes to melt into the other. Under the latter circumstance, each race is on guard,—protecting itself. That is what we mean by race prejudice. It is primordial in basic character, signifying self protection, and calling for nothing but frank and good natured recognition as such.

Those of us who imagine ourselves to be generous pretend to have no race prejudice, but race prejudice is as large within each of us as the seed of an avocado, and for the same reason.

In ancient Greece the people of other races were tolerated as barbarians, and in the Golden days of civilization in Greece, or in the Elizabethan period in England, and in the time of Louis XIV in France, or at the present time in our great capitals, race prejudice has manifested itself quite as distinctly as it will continue to manifest itself for all time. It is instinctive and relates to race preservation.

Race prejudice is most marked against the Jews in countries in which the people are least able to compete intellectually with them. Wherever the Jews form a part of the population, even in those higher circles in which race prejudice is theoretically pretty well obliterated, it is always present as an insidious influence, for the same reason that the avocado has a potent seed. There is a certain subliminal prejudice which is manifested really without our knowledge, but which makes as constant impression as that made by a man who leans his weight against a barge, gradually moving the barge away from the dock. If the Jews were to form a nation confined to just one continent, with their own cities and their own complete social organization the Aryans would be received very politely and apparently on even terms in the higher Jewish circles, and yet there would be an instinctive prejudice manifested by the Jews toward any Aryans who happened to be in their midst. This does not mean necessarily that one race is superior to another race. It simply indicates the nature of the seed within the avocado, no matter how smooth, and soft, and attractive the covering over the seed. The avocado depends upon its seed for purposes of race preservation. In a race of people like the Jews, who recede like water in the presence of rebuff and who return as quietly, as quickly, and as undisturbed as water when the rebuff ceases, we have a social force as powerful as that of water among physical forces. It is particularly in Army and Navy circles that the

insidious but repressed instinct of race protection is most deeply felt, for the fundamental reason that Army and Navy are established by a nation for the very purpose of defending the race which is dominant in that nation. In military and naval circles we also have the highest development of social polish; consequently, the undercurrent of race prejudice is bound to make an upheaval whenever the question comes to the surface of smooth-running superficial social custom.

Race prejudice is most openly expressed by those who are most keenly in competition with each other. In the laboring class we find race prejudice much more in plain evidence than it is in polite circles. It is amusing to observe the struggle to avoid hypocrisy in Christian circles when an attempt is made to place principles or religion above race prejudice. The reason why this cannot be successfully accomplished is because it is fundamentally impossible. Reference is made elsewhere in these notes to the effect of crossing species as compared with the result of crossing varieties. When the question of admitting Japanese to the Young Men's Christian Associations on the Pacific Coast or in Hawaii came up, it required a long time for the conscientious members of the Association to decide that Japanese were not to be admitted. Here was an instance of a painful upheaval of emotions, then a temporary yielding to the higher intellectual dictations and the influence of Christ, but finally a submission to the instinctive fundamental feeling of race preservation. As a matter of fact, the Y. M. C. A. is a most excellent social club with no more than a normal proportion of hypocrisies. Different nations represent different social clubs also. The question was therefore settled finally according to customary club standards, rather than according to the teachings of those who revealed Christianity to the Japanese and to other Oriental peoples. It would seem almost as though it would be an interesting feature of

the Y. M. C. A. to have Christians of many different nationalities accepted at their social club, but instinctive race prejudice will win in the end. When the Jews are finally in control of civilized nations they will not be as cruel to us as we have been to them, for the simple reason that having won, they can then afford to be generous in the course of exercising all of the higher functions of the intellect.

The reason why I chose the seed of the avocado as a picture of race prejudice is because this big hard seed is covered by the blandest, slipperiest, most delicately flavored of coverings, but Lord! how durable is the seed within. You may partake of the delicious part of the fruit,—that represents civilization. Beware of trying to assimilate the seed, for that represents the instinctive desire for race preservation which has been given us by nature. In transactions of commerce the seed of the avocado is sold along with its delicious covering. Race prejudice does not disturb commerce much.

If two races frankly, clearly and distinctly retain their identity, and proclaim their intention of friendly alliance, it will avoid introduction of disturbing social questions which go with the assimilation idea. Attempts at a similar assimilation in the plant world would make havoc for the most part. The internal coherence through force of religion of the Jew, and force of external pressure from other races, have had the result of welding into form a most compact race which now possesses such inherent power that it would seem almost a pity for any disintegrating element to enter. The melting pot is not wanted.

These two influences of internal cohesion and external pressure have kept Jews together closely, with the result of development of a race strongly fitted for survival. The object lesson would seem to oppose any idea of strength coming from inter-marriage among people of different races. We know

well enough that a weakening effect results when black and white marry. As crossing of black and white continues, the few children are especially vulnerable to microbe attack, and octoroons are particularly susceptible to tubercle bacillus influence and to other infections.

Nature has evidently intended to preserve the identity of races rather than to make a merger of races at an early date. Eventual brotherhood of man does not mean a merger of all races in the course of evolution. We must first have a disappearance of those races which are least fit to become brothers and take charge of the world. We cannot say at the present time that some yellow race or some black race may not be in preparation by nature for eventual domination. Meantime there can never be union between the negro and Caucasian races, for the reason that each race is a kind of social club. Men who are peers of each other in every respect, but of different races, may not be acceptable in each other's national social clubs. It is the part of the negro to keep to his racial club, developing his industrial possibilities, having his own universities, and learned professors, his own magnates, clergy and lawyers, but he is not to attempt to occupy governing or administrative positions in public service while Caucasians are in power. The negro is welcome to membership in almost every useful activity of the Caucasian race with which he is associated. He will be welcome to take part in almost everything excepting office holding. That particular point introduces the question of fundamental club instinct, and will furnish a cause for continued disturbance over the race question, unless it is clearly recognized as belonging to the club question and arranged upon that basis. There is no more of a negro question in agriculture, than there is of a socialist question in agriculture. The subject is brought forward violently only in relation to marriage and office holding. It

is my opinion that we have negroes who are capable of filling every office in the United States, from that of president down, but they should not ask for political appointment. There are so many better things than office holding anyway. It is not even held to be desirable by the great majority of Caucasians themselves. Men of a certain type of mind care for office holding, but among Caucasians in the United States of North America this type of mind is probably found in comparatively few men. Most people prefer to devote themselves to the industries and to the professions.

I was down in Georgia the other day and incidentally asked about the negro question. My friends replied, "There is no negro question here. If you have any spare negroes, send them down to us." I went over to Mississippi, and people there said the same thing—"Send us all the negroes you do not want up North!"

The "negro question" will not be settled until negroes stop aspiring for positions in government service. They may develop all of their finest attributes in the industries and professions. There is no particular need for their being used as a wedge for disturbing the equilibrium of the race which is in control of our government at the present time. We have a somewhat applicable object lesson in the Southern Surgical and Gynecological Association. The officers are all southern men. There are many northern members, who are proud of being associated with the southern members,—proud of maintaining our position in science along with them in their association. So long as the southerners are in control of the organization, none of us who are from the north would think of causing inevitable disturbance, actual disruption of the ideals of the association, by asking for official position. We do not even care to vote for officers.

The best proposition for the negro would seem to be the

establishment of colonies upon African soil by men who have gained the advantage of association with educational methods of the white man. The experience of frequent revolutions which occur in the negro republic of Haiti might not be repeated at all, if negroes who are representative of the very highest educational systems were to exert guiding force for these colonies. When the educated men of Japan left their esoteric traditions and expanded into the science of the world exoterically they returned home and made Japan one of the great powers. Negroes who have expanded into our best educational systems may return and make a great power in Africa. The land is there; harbors for shipping are there;—everything favoring commerce is there.

The race question in America may be studied with basic simplicity. The negro question may be compared with an hypothetical proposition of Japanese coming here and occupying one state of the Union. This is the proposition in its simplest form. The second step in elaboration takes the alien not into one state but into parts of several states and occupying acre lots. The third step in elaboration introduces the idea that we brought the negro here, and later paid him to remain. That ends the economic side of the simple question. Negroes were brought here against their wishes, and then paid to stay,—which was in accordance with their wishes.

If we next put the esthetic part of the question in its simplest form, the white race is a club and the black race is a club. First step in elaboration—men may be playing tennis in the same court, and yet not belong to the same social club. They may be picking grapes in the same garden but not belonging to the same social club. That ends the simple esthetic proposition.

In practical application of the social club idea, based upon our knowledge of history and our knowledge of the relations

of one race to another,—the negro will stay with us as long as we wish him to do so. After that, one race or the other must go. History tells us what to anticipate when race questions are carried to forcible logical conclusion, and nature has apparently implied no intention of settling race questions in any other way when conclusions are forced.

The pageantry of wealth, of power, and of social preferment is desirable. It represents a display of the habits of *Homo sapiens,*—to which species we must allow as wide a range of action as we give to any animal in an enclosure, if we wish to study its natural habits.

We are simply watching animals in an enclosure when observing the habits of people of this particular planet of ours.

The monistic unity state is not to be a perfect state, it is to consist of people who are in advance of the present civilized nations. The business man at the head of the new state will allow the same pageantry of wealth, of power, and of social preferment. He will allow the social club feeling to remain as an instinctive expression of desire for race preservation.

The four strongest races of mankind are the Aryan, Semitic, Malay, and Tartar. Hybrids between individuals of these distinct races have commonly been so worthless that we apparently have evidence of nature's wish to keep strong races apart and distinct. The strongest nations appear to have arisen from varietal hybrids rather than from specific hybrids. The Aryan nations have now, for the most part, reached cultural limitations and are on the decline. (Aryan race not declining.) It is not an untenable idea that the Serb may make the last Aryan stand: but Tartars and Malays, not adapted for a high degree of governmental capacity, will be decimated by warfare and by various microbic influences in all probability before reaching that high degree of culture which

allows physical decadence to end a race. Some of the Aryans, —the Spanish for instance,—still retain great physical strength and breeding capacity. They have been conquerors because of their courage and intelligence, but they cannot long maintain any important position as governors, because decomposition of character occurs so readily among the ones who are moved up to ruling positions. The same statement is true of the Russians, and could the Russian temperament avoid decomposition of character in its officials, this division of Slavs might more rapidly dominate all other Aryans.

At the present moment Russia cannot compete successfully with a smaller country like Germany, in which capacity for government is very large, even though physical decadence is now taking place in that country rapidly. There have been few instances in Germany like the recent scandal relating to the fomenting of war scare and the bribing of officials connected with the department of war supplies. Worldwide attention was attracted because of the exceptional nature of the report in its moral aspects. In some other countries the same kind of charges would attract attention merely to the social question which was involved, rather than to the moral question proper. It seems to be nature's plan to define cultural limitations not only through actual physical degeneration, but also through decomposition of character in men who are given official position.

We cannot settle the question if other nations are inferior to ours. That question is settled by nature, who has her own definition of inferiority. We are inferior to an ideal nation, with our craft, and inconsistencies and cowardice toward facts. We like to deceive ourselves and each other during this present stage of semi-domestication of man.

A writer in one of our magazines calls attention to the fact

that races which have the finest teeth are the ones which never cleanse them. His apparent intention is to lead us to a deduction that if we do not cleanse our teeth we shall have the finest. If we follow the modes of life of people who have the finest teeth we shall have teeth of a similar sort, with or without cleansing. The toilet refinement is simply a matter of taste.

Aristocracy is a natural incident. According to Polybius we begin with barbarism, then go to democracy, then to aristocracy, and back to barbarism again in each cultural period. Recorded cultural periods in Peru and Egypt, five in number, occupied about five hundred years each, but were presumably dealing with rather constant types of people. In America and in Europe, where new elements of many kinds of people are actually entering, we cannot tell how long the present cultural period will last. In the present cultural period, long drawn out and changing more slowly than the early cultural periods, the world is becoming as democratic as Jesus, but has not quite followed the spirit of Christ on this cultural trip. The spirit of Christ, however, is more evenly distributed than it was in previous cultural periods, and a thousand years or so from now in some wholly new period the spirit of Christ may be attained still more successfully by the multitude. Ten thousand years from now His type may be the dominant one.

The lack of Christ spirit in the present movement toward democracy may be due to the fact that such a movement is unnatural and untimely. There should first be an intercurrent period of barbarism, following the aristocracy of to-day which is represented chiefly in its phase of plutocracy. A general war may be required for putting nature's machinery in order again now that she has missed a cog. Possibly Slavic barbar-

ism for Europe and America is at this moment impending. The natural alternative would be a still higher degree of aristocracy for a generation or so until the proper time arrives for a return of the civilized world to its wonted period of barbarism.

Nature makes changes through man's agency in the name of God. When nature wished to replace primitive races of South America by the more highly developed Spaniard, she told the Spaniard to go to these people and say: "Here I am. God is with me. Give me your gold and I will give you religion in exchange. Let me kill all men who are irreverent." When the Puritans were driven out of England, and the Puritan in turn imposed his cruelties upon new people, it was still in the name of God. What was good enough for God was good enough for the Puritan. In other words a plan of nature;—she wished to have people of relatively higher degrees of development replace simpler people. When the North and the South were in conflict, clergy on both sides prayed fervently in the name of God that each respective side should win, because it was in the right. Nature won in her own way, cruelly if you please, from our standpoint, but with the accomplishment of her end.

Young women cry because their parents or guardians will not allow them to enlist as soldiers in times of war. Their eagerness is incited by the justice of the cause. It goes on simultaneously in all of the different countries upon both sides. Women of all of the warring countries sell their engagement rings and other heart-close treasures in self-sacrificing spirit, because of the justice of the cause. We may not know upon which side the soldiers are in a state of grace, but the women upon both sides appear to be in a state of grace through self sacrifice.

Timur Leng, a petty chieftain and robber, became ruler from snow to dates. He was a devastating conqueror, spurred on to victory by the justice of his cause,—defense of the True Faith against Christianity. (Civilization has gotten even with him by misspelling his name for centuries, calling him Timber Lane and things like that.)

During the early part of the 1914 war I became convinced that "justice of the cause" is such a brightly shining objective that it actually places partisans in a psychotic state, allied to if not actually constituting a form of hypnosis.

A German friend informed me to-day that no important part of the army had been sent against the Russians up to the present time. This is the fifth month of the war. My friend is a highly educated man and competent to form a judicial opinion on almost any subject. This statement of his caused me to look up in a bit of surprise and I perceived a peculiar expression in his eyes. A sudden understanding came over me. My friend was hypnotized. No one can argue with a mind which is in that psychotic condition. It is not open to ordinary impression.

One may readily try an experiment in demonstration of this fact. Catch in the chicken coop the wildest chicken. Draw a chalk line upon the floor of the barn; press the chicken gently against the floor in a sitting position and draw his neck out straight until the tip of his bill rests upon the chalk line. Now step aside and you will observe that the chicken is unable to move away from that chalk line. Threatening him with a stick, and allowing him to observe that all doors are open for his escape will have no effect. There he remains with his bill upon the chalk line. He reasons that the awkward position in which you have placed him has some association with the chalk line, and having fixed his mind upon the chalk line, he cannot understand that anything remains for him in the world

excepting the position in which he was placed when he went into the hypnotic state.

There are many people who would not take the trouble to step out to the barn and try this simple experiment. They would rather argue about its improbabilities. There are many people who will not take the trouble to observe the extent to which hypnotism is really present among earnest patriots. Such people argue about the improbability of such a psychotic condition being at all general as a force to be reckoned with, when making a serious study of the situation. My friend set me at thinking along that line and my thoughts do not seem to be inclined to change their direction.

Warfare represents a phylogenetic remnant dating back to the primitive struggle for food. Ability to obtain food depended upon freedom from limitation of the individual organism, and warfare at the present time represents basically this primitive response to limitation, or to a feeling of limitation in nearer relation than the food supply question. The boy is in warfare with his mother who thinks it best not to let him go fishing. The militant suffragist is in warfare with the State which holds, rightly or wrongly, that the woman vote is unnecessary. The socialist is in warfare with the capitalist because he acknowledges he has failed, starting from an even footing, to acquire what his contemporaries have acquired. He wishes to distribute their property—not his own. Each one of the American Indians, in former days, needed ten square miles of territory for providing sustenance according to his method of living, and the idea of being confined to a single square mile per Indian put him in a fighting mood. The Chinaman, with a single acre at his disposal feels peaceful, because he has learned how to gain sustenance enough from that acre. The feeling of need for warfare,

therefore, while fundamentally and primordially a food question, only relates at the present time to the feeling which goes with acquired methods of living on the part of any individual, tribe or race.

It is cowardice or blindness or counting-house expediency which leads man to attack a comparatively weak enemy like a brother nation, instead of a greater enemy, the microbe, which is more deserving of his intelligence and right at hand. It is nature's plan, or has been up to the present time, to keep man blinded to the effects of the presence of the greater enemy,—a greater enemy than one nation has ever been to any other nation in all history.

I believe in warfare. It is ennobling and brings out our martial traits and virtues. I believe, however, in not going at it blindly and fighting a lesser enemy like another nation. I prefer warfare against a larger enemy more worthy of our skill,—the microbe.

The statisticians show us that in warfare between nations, the microbe kills many more people than are killed by bullets, the proportion of microbe deaths being sometimes more than ten to one according to accurately reported army records. Warfare with the microbe, however, continues when nations are at peace, an incessant warfare, but nature plans that we shall not become alarmed about it, otherwise evolution of the nations would be disarranged.

Instead of war between nations in the idea of increasing national boundaries, the monistic unity state,—having no national boundaries,—will increase its land value by intensive cultivation, increasing the boundaries of efficiency rather than gross territorial boundaries.

In warfare between races treaty compacts are made for the inalienable rights to life, liberty and the pursuit of happiness, and yet in the greatest of all warfares no such treaty has

been made with the microbe. This is to constitute the chief effort of the diplomatist in bacteriology and psychology of the future.

The restless instinct for improvement which has been placed in mankind belongs to nature's plan, and it finds an expression in warfare and barbarism in feudal times. It is expressed in warfare of minds in times of peace between nations. Warfare then represents a normal condition, and the methods of warfare are only incidents. It is a question if static peace is at any time to be the normal condition of mankind. The football player does not want his game abolished.

The governments of the world are gradually adjusting their institutions to the ideals of modern civilization, but meanwhile the inferior sorts of weeds which occupy the ground in the garden have to be pulled up, and are being pulled up by warfare.

The most important factor that is ever forgotten in the history of evolution of civilization is the fact that conditions favoring cultivation of plants and of animals favor at the same time cultivation of microbes, good and bad. The most important influences recorded in Buckle's History of Civilization in England are simple of comprehension in comparison with the stupendous influence of the microbe in the history of that very same particular civilization.

A nation is likely to be preserved in proportion as individuals of that nation have in mind the idea of preserving it. In time of warfare one nation has this idea developed in a large way out of the reserve part of the mind. The opposing nation is such an obvious feature as to engage deep and immediate interest, just as people become interested in a fad and call up that reserve part of the mind to a point that seems ludicrous to others.

It requires more strength and more skill to live in the north

than it does to live in the south. That kind of sport (northern living) attracted strong men who enjoyed the skill of playing the game for stakes of food and raiment. Hardships are nothing but enjoyable adventure for the strong. From the mountains of India the best Aryans went north. Out of the north came the races which chose that region because on account of their strength they enjoyed the sport of the game. They spread forth to conquer and to govern. There have been plenty of conquering nations from much nearer the equator, but the ability to govern requires a more highly developed set of faculties.

The conquering races are not necessarily governing races.

When people like the Indians have their confidence engaged by missionaries and destroyed later by politicians and traders, the great majority of civilized people are not complacent toward such cruelty. The point is that in higher civilization there exists an element capable of doing savage things intelligently, but this element, active in accomplishing its results, represents only a small part of the entire civilized group. We remember, however, only the cruelty of the last winner, forgetting that primitive people in their incessant tribal wars are equally cruel to each other, up to the extent of their intelligence. When a more highly organized nation is successful over these people, already cruel to each other, it is simply carrying out what seems to be nature's plan. Nature's plan is still further shown when any dominant race, as for instance the Spaniards, gain control, and then progress to the highest point of their national development. Doubling of the rose follows, and they lose much that was gained by their active men in previous conquest. The greatness of the French people can be appreciated by *reductio ad absurdum* if we consider the wonderful doubling roses in Paris. It is a strong nation indeed which can continue to furnish such a great number of

doubling roses, and we observe the latent strength of wild roses of this nation in the provinces of France and in the colonies. One may almost say that when a French Canadian cuts down a tree he puts a child in its place.

Can we return to the simple conditions belonging to native races? No. We find that nature seems to have a plan for allowing a simple people with their established standards of ethics to lead happy enough lives, in adaptation to their surroundings. Missionaries step in and gain the confidence of natives in the white man. Confidence having been obtained, the way is opened for politicians and their followers, the traders, who destroy any confidence which has been developed by the missionaries. The people then begin to grope about for a new adjustment, and between fluctuations of confidence and suspicion born of their experience, cannot get back to their equilibrium as a people. Competition then takes place between the skill of civilized people, so-called, and the skill of the savage people, so-called. The former win through their superior intelligence. Justification of this course is not found in any laws of man, but there is apparently justification in the laws of nature, which seem to have this definite plan of procedure. Individuals in the winning race will elaborate means for winning against each other in matters of trade or in social supremacy. It is all in response to the same instinct for domination.

The fact that nations act like children is evidence that we are all still youngsters in nature's plan. The weakest die youngest, American Indian tribes, for instance.

No matter how well adapted the Indian was to his conditions, he was never the best as a canoeman, trapper, or rifle shot, any more than he was best as architect or artist. The white man was a better canoeman, trapper and rifle shot. Romance prefers to believe that the Indian was the best man

to be found in the woods, but practical white trappers and hunters know better.

Why do we need to assume that the Incas and the prehistoric people of South America came over to that continent? Did the maple tree come over, or the opossum? I would rather believe they developed locally by evolution. In isothermal belts around the world we have closely allied animals and plants which developed by evolution in their respective localities. The different races of men, it seems to me, may just as well have developed locally.

In all progress of civilized countries there are three chief stages. First the stage of superstition, and the strongest men are often at that time the ones who are most superstitious. The next stage—analytic—is that of an immense collection of facts by great numbers of workers, and the best man is the one who collects the largest number of facts. The third stage consists in a synthesis of the facts, and the strongest men are the ones who adjust the largest number of lenses for bringing facts together upon a focal point. Superstition is followed by analysis, analysis by synthesis. It becomes more and more difficult and requires far greater minds to-day for synthesis than were required in the days of Alexander von Humboldt. The greatest advances during the next century will be from a basis of biology, and all biology will be recognized as a burden carried upon the back of the microbe, upon which synthetizing lenses will be turned.

In the various cultural periods all methods of men up to the present time have been failures in a way, because nature has ruled in her way after all, with the aid of the microbe. The present decadence of older civilized nations means failure for man and his ways, but nature has some plan back of it all.

It will be interesting to note in America, where we have representatives of so many different nations producing the impression, if the cultural period will be much longer than in ancient civilizations, where fewer types were involved. It is a curious fact that in the older civilizations characteristic accomplishments common to both hemispheres occurred simultaneously;—for instance, the methods for moving enormous monoliths in Egypt and in Peru, the art having subsequently been lost to history.

Not only have we the stone and bone records of cultural periods antedating history, but of glacial periods antedating cultural periods. Schmidt's observations of four glacial periods in Switzerland corresponding to Winchell's later discoveries in Kansas, show that the glacial periods were contemporaneous in both hemispheres.

Viewed from a monistic unity standpoint the paganism of Greece, Rome and Egypt was simply an heroic outlook of the best civilization of the time. This was replaced by Christianity in the ordinary course of evolution and understanding. Christianity, the best outlook of our present time, may be considered as heroic later on when it becomes replaced by some science that has reached an understanding of the spiritual life and which allows the spiritual life to be stated in scientific terms. In all great evolution of thought the mind casts light far ahead of the automobile in which we are travelling, serving to guide the man at the wheel until objects dimly seen ahead become well defined when close at hand. These objects are then passed and understood, while new dim objects come into view as we whirl along. Christianity is our present light.

The Greeks did not worship beauty to the exclusion of utility, as the new pagans would have us think. Such a view is evidence of the decadent nature of the new pagans. In

Greece at its best, beauty not only went hand in hand with utility, but with polity as well. The Jew at the same time was as busy with his morals as the Greek with his art, or the Roman with his law, and because value, like matter, is indestructible, modern civilization has been enabled to join morals from Judæa with beauty from Greece, in all that is really noblest in our present basic formulæ of culture. It is not progress to leave Christianity for neo-paganism. It is going backward, and on a wrong road at that.

Man's desire for beauty combined with utility is nothing more than a representation of nature's own desire. Nature looked over her artistic design of excurrent trees for the far North. "Good!" said she. "These pointed tops and compact limbs are fine for meeting blast of wind and weight of snow, and well arranged for catching light, but when I see their rugged lines, even *en silhouette* along a mountain top, there is something forbidding in their severity. The deliquescent poplars, birches or willows which I have interspersed among them do not suffice for softening effect. Whatever shall I do for bringing to them beauty?" Along came the moss fairy. "Dear Nature," said she, "you have been good to me. You have made my ways easy in life and now I shall relieve your distress and reward your kindness by spreading my softest of green-gray mosses all over the severe limbs of your serried ranks of pointed firs."

It is said that the Athenian state began to fall when Greece developed art for art's sake, but this is only incidental to a decadent period, and did not stand in cause and effect relationship to the downfall.

Jugurtha bribed the Roman generals long before the actual fall of Rome.

If we carry the mysteries of the rise and fall of the Athenian state to the rose garden for a matter of comparative study,

we shall see that it was not through lack of law or lack of religion that Greece fell. It was not because of injustice or immorality,—these were incidental. It was not because Greece developed art for art's sake. It was not because malarial and other diseases caused havoc. The basic reason was because the doubling roses of culture did not have progeny enough of their own kind.

This history parallels the history, I presume, of various civilizations which have "mysteriously" disappeared. The mystery lessens when we go to the horticulturist for answers. The weaknesses brought forward by historians to account for the fall of Greece were only the ones that we see in the rose garden, and were incidental to reaching the limit of development of cell plasm allowed by nature for that variety of our species. The fall of Greece and of Rome were merely conspicuous events in the history of mankind rather than unusual events. In fact, they seem to have been quite ordinary events; repetition of what had occurred before, and prognostic of what will occur again.

If the highest development of Greece gave us in art the human form, with the mind and soul equally balanced, while our subsequent civilization gives us mind and soul in preponderance, a natural deduction would be that the world is becoming more spiritual. A civilization following our Christian period may make again as radical a change in its manner of expression as we have changed from the Greek.

Among people of two distinct types of present-day civilization we note that the Oriental mind concerns itself characteristically with development of mind, while the Occidental mind characteristically concerns itself with matter through practical application of mind. We therefore classify people of the East and of the West as we distinguish between the scoter and the kingbird. The scoter ventures into the depths of one

element for food, the kingbird ventures into the depths of another element for food, although both belong to the avian fauna, just as the Oriental and the Occidental belong to the mammalian fauna.

I am asked if the placid Chinese temperament depends upon relative absence of the colon bacillus. There are no means at hand for getting at a solution of the question. We find about as many peoples in China as in Europe, some of them living largely upon rice and other vegetables. Others in the mountains and on the plains, devoted to grazing, live largely upon meat which would favor development of the colon bacillus. On the whole the term "Chinese temperament" suggested by the Chinese whom we know in America, is understood as belonging to a placid contented people, given to quiet intellectual pursuits, and without genius in great degree—at least as Oriental genius is looked upon from the Occidental standpoint—but this in itself is a relative matter. The subject, however, is one worthy of observation. Discontent, so far as I know, depends more largely upon the influence of the colon bacillus perhaps than upon any other single cause under Occidental conditions.

When a small nation comes into new great power we usually find some fundamental source of strength which can be stated in terms of understanding. Japan has taken up quickly the best knowledge obtainable from Occidental civilizations, unfettered by the traditions which hamper these other civilizations. Bulgaria has tremendous physical power due to mountain life and perhaps specifically to the use of the Bulgarian bacillus in daily food.

When an older nation of established reputation in military and naval affairs is suddenly defeated in war, as the Russians by the Japanese, or the Turks by the Bulgarians, it has always

been a surprise to diplomatists of the world, and will continue to be a surprise until the time comes when we comprehend the undermining influence of senescent protoplasm upon any nation which has become established. The real reason will be understood. The microbe, man's chief enemy, has been at work undermining one nation, and helping the other. Patriotism is a primordial prejudice—weakest in double roses of nations which nature is holding in check. We shall await with interest the time when craft in higher Japanese official circles may portend the approach of cultural limitations for that people of such present promise.

It is true that Japanese tradesmen politely compliment a customer by testing his intelligence and skill at detecting them in a fraud. This is a matter of local standards, however, and so thoroughly understood locally that it does not stand for defective character.

There seems little mystery in destiny, because past history and present factors are too clearly displayed.

During twelve thousand years of history the world has never had at its head an organizing mind (as we understand organization) for best effect against waste. This would seem to indicate that an organizing plan greater than we can comprehend is back of all of our activities.

A business man at the head of the world would have the means at hand for making America the greatest power in the present Christian period, provided that he chose to make bacteriology the first science and pedagogy the second science in rank of importance above all other sciences. In the monistic unity state philosophy, theology, religion, and all other educational convictions must be subject to laboratory examination by the bacteriologist and the psychologist, but pedagogy as a distributing science will take charge of all other contributing sciences, when they are to be utilized to best advantage.

One of nature's corrective resources for limiting the size of aggregations of a gregarious species seems to be the desire of individuals to make others uncomfortable to the point of their separating from the aggregation. The uneasy ones either drive the others from the herd or leave it themselves. In the lower forms of life we note that gregarious fishes in a school annoy each other very little, because nature has furnished predatory species enough to limit the aggregations. Birds in flocks annoy each other a little more, horses in herds annoy each other more yet, and simians in a troop annoy each other more than other animals excepting man, who is very largely devoted to annoying his neighbor. It seems in each case to be a manifestation—hieroglyphic—which may be translated as meaning that too large aggregations must not be allowed to remain in comfort. Fishes will be devoured by predatory species and their aggregations limited. Birds will be divided at breeding time more or less, with a tendency to break up into smaller flocks. Ascending higher in the scale we note that intelligence is at present opposed to any plan of splitting up man into small flocks, although the dissatisfied neurotic disturber appears in almost every group of people who become associated for useful purposes. Horses which are much annoyed form a separate herd with a new leader. To say that the error of giving man the gregarious habit and then having to find means for limiting its consequences by another error,—and that God intended all of these errors from the beginning,—is not in accordance with the daily experience and observation of the business man as an indication of omnipotence. The business man at once sees that it is a case of help wanted, a good manager needed. He is not contented with the statement of Theology about this world business being run all right, and no need to bother about having any books kept. I would not destroy any faith of valuable char-

acter--but only that sort of faith which is commonly observed among doctors who keep no books in their business accounts.

Poets frequently refer to the peaceful hamlet. This is an expression of poetic wish of high order and beautiful conception, yet I never look at a quiet village analytically without wishing to have the poet continue to remain away from facts. In the so-called peaceful hamlets we commonly find less peace than elsewhere because the primordial instinct of annoying our neighbors in order to avert too early aggregation of a gregarious species is represented in a crude form in sparsely settled localities. It is not tempered by the amenities and reason belonging to culture and higher control. Wherever I have travelled, in any part of the world, the rural village has been the place in which crude and untutored expression was given to primitive methods of conflict between individuals and families. Anything so general as this sort of conflict must represent natural law.

Social sterility in the hamlet is due to our present educational methods, rather than to lack of good material among country people. Let any one fall ill or have a misfortune, and the neighbors for miles around will proffer their aid tenderly and sincerely. Excitement is what they crave, and the opportunity to be remarkably kind introduces a valued form of excitement.

The statement is as true to-day as when made by Plato that the two chief causes for degeneration are poverty and wealth, and this will always be the case among men and plants. Extreme conditions have a tendency to eliminate extreme types, leaving the exemplar in control. The nearer a nation can come then to reducing the degree of extreme wealth and extreme poverty in the interest of the exemplar, the better for that nation. What is the very best thing, the thing most worth while for nations? It is education of the exemplar, the masses,

and removal of extreme types. This means killing off the superman and the criminal defective, for both belong to extreme types, and their progeny swing too far from the exemplar when nature tries to keep time with the pendulum. The boy who swings from pinching poverty to a condition of affluence is commonly so warped by the struggle that he does not represent a well-rounded exemplar. The supreme genius commonly swings his progeny back to a markedly defective type instead of to the well-rounded exemplar. Let us take a parallel in plant life. The Newtown Pippin and the Northern Spy are recognized as supermen among apples. On that account hundreds of thousands of seeds of these supermen have been planted by orchardists experimentally. Among the hundreds of thousands of progeny of these apples, not one has approached the parent closely in value and most of the progeny have fallen in character even below the exemplar. In other words, nature has preserved the exemplar for the apple by making the progeny of its supermen as much inferior to the common run as was necessary for maintaining a balance. The snow apple, on the other hand, represents an exceptionally good exemplar. Hundreds of thousands of the snow apple seeds have been planted, giving hundreds of thousands of first-rate exemplar apples with an occasional superman, like the McIntosh red. The seeds of this superman in turn do not give us even the average exemplar of the snow apple as a rule, when they are planted. The snow apple and the masses of people can give us a good proportion of the average exemplar. Our hope and cheer and even inspiration lie in successive plantings of selected seed from the best of the exemplar type of apples, not trying to gain time by pulling the pendulum so far forward that it swings too far back, missing a rhythmical cog stroke at each end of the swing.

Just as botany missed its opportunity to take charge of

bacteriology and then *seriatim* of all of the sciences, so we have missed our opportunity in America to take charge of education in such a way as to make it comprehend all growth. Ask a writer of doggerel how he came to be a poet and he will reply that it "came to him." Manifestations of the same sort came to us. If America had been Puritan only, or Cavalier only, or Dutch only, we might have taken charge of the earth. Along came the mixed immigrants in hordes, and now we cannot even rhyme in the degree that naturally "came to us." Our educational system is really in advance of that of many of the older countries, but we have not developed it in proportion to the opportunities which are all about us, and which will be seized upon by the chosen race. We make progress regardless of what "comes to us."

In imagination I like to picture the future historian of some subsequent race as saying to his audience that "the Jews gave us morality and deism, the Romans gave us law, the Greeks gave us philosophy and art, the Americans gave us disbelief in the value of art and literature which was instigated by the microbe,—thereby preserving the health of criticism. In any event America gave to the world a method for taking a new strong vigorous view of life, unobstructed by the morbid perspectives which had been carried to the latter part of the nineteenth century. The influence upon literature of microbic mental illness, like black death and the plagues that once devastated nations, was finally cleared away from the field by Americans."

Since the days when Plato founded the first academy with Aristotle its leading mind, and when Ptolemy sent Dionysius abroad to collect specimens for the Alexandrian Museum, the growth of civilization has been marked by a vast increase in academies and museums, which stand as hind wheel hubs

about which the culture and learning of any locality circle. The front wheel hubs of civilization are the library and the laboratory.

As a fundamental feature of education in art, science and literature, pedagogy should begin with the teaching of fundamental physics. All history, for instance, depends upon physiology and bacteriology, and these in turn are based upon a knowledge of primitive physical influences, and these again in turn depend upon a knowledge of the three physical entities, energy, matter, and the ether. Pedagogy then exercising its function as chief distributing science will play second part only to bacteriology, which is to become the chief producing science in the field of knowledge. Logic will always be the directing science.

Pedagogy with its already ponderous traditions has barely made a beginning in team work with psychology, which is to be one of its greatest contributors. Teaching by rule and by method, which takes no account of the personal psychology of each separate individual, must be considered in the light of crude procedure. A great deal of skill may be required for unerringly carrying the drill of an idea down to the stratum of consciousness for which it was intended in another individual, even in ordinary wide-awake conversation. The drill is deflected by so intangible a force as mere attitude of mind. Not long ago I was discussing with a very clever Episcopalian some of the beauties of the old pagan religions, which gave a separate god to each living thing. The idea was described as being similar to the monistic unity belief that a part of "God" really entered into every tiny little living thing, "including bishops" (I said parenthetically). "Now, now," she replied reprovingly, "you would not mean that to apply to your dear friend Bishop B."

A foreigner was being entertained at dinner in New York,

when his hostess complimented him upon his youthful appearance and incidentally quoted the idea that a man is as old as he feels and a woman is as old as she looks. The foreigner, wishing to be very polite, responded amiably, "Ah, Madam, surely zat is not ze case viz you." Her gracious attitude of mind suggested a response in kind.

Returning to my friend Bishop B. for a moment. We began fishing one day when clouds of black flies were extremely pesky. The Bishop was employing words to which he was accustomed, but with transmutation of their energy. I pretended to put on a long face and to be shocked. Much to my surprise, he took my remark seriously, although he might have noted that it was I who first aimed appropriate phraseology toward black flies. My assumed attitude of mind had not carried the drill exactly to the stratum of consciousness for which it was intended. *Simulium similibus curantur!*

Instances of deflection of the drill or of its guidance, under slight influences, would include some phrase of about everything that is said by anybody during the day. My point is simply to illustrate the idea that pedagogy when attempting to teach by rule and method must appoint psychology to the office of privy councillor. . . . Children at public school are taught politeness. In answer to my question they reply, "Yes ma'am!" and yet I trust there is nothing in my appearance which would warrant any such innuendo.

The parents of scholars may know the advantages of education at the time when the scholar does not. Consequently there is, according to our present system, much warfare between parents and children. Even in cases of children who are well brought up there is a tendency for them to look upon parents as tyrants. In fact parents are really exercising necessary tyrannical control over phylogenetic barbarians.

If a child is disobedient, it is a good sign of independence inherited from the parents. Given proper attention and training, and such a child is more promising than the one who is inclined to obey the suggestions of the world.

Tell me that a man has well-trained dogs, and I already understand a great deal of that man's nature. If a pup wishes to do something and the owner says "No!" a few times (for instance, getting food at the table), but finally yields on account of the dog's persistence, the dog has learned his first lesson, which is that if he makes bother enough he will finally obtain what he wants. It is precisely the same way in rearing children. If a child meets with a "No!" when expressing a wish, but keeps at it for a while, and the parent finally gives in, the child has learned a lesson, that if he only makes trouble enough, he may finally accomplish his object.

Under educational influences which would seek out, employ, and emphasize individual qualities of value in the child, we would have ideal conditions. This is done frequently by parents who have talent, wisdom and time requisite for the purpose, but the school system as a rule obliterates personality because it is more convenient for the teacher to make the law of the average supreme. Teachers are not paid enough by the school board to keep them contented. Many are incompetent, or look after personal ambitions. The resulting waste of children is apparently in nature's plan of waste, but the chosen nation will carry this waste to small proportions by having highly salaried teachers.

The question of income for professors at educational institutions is always an important one. I would give each professor at least five thousand dollars a year from endowments, irrespective of the cost of living in the town, and let him secure what else he could from perquisites, and side issues, but I would make the income large enough for a good living,

so that he could devote himself to his work. It is possible there would not be so many textbooks written or so many inventions patented, but I believe, on the whole, that teaching would be improved in quality. It is true that a man soon learns to live up to ten thousand dollars a year and finds that amount scant for his needs, but the greater proportion of people will be enabled to live freely in most large towns in America on half of that.

Money given to education, and particularly for education in science, makes the most satisfactory sort of endowment, perhaps, next to conservation, because it sets at work the sort of people who are eager for work and who are to labor for advancement of the world. Large fortunes commonly have the effect, when divided, of dividing families and instigating a spirit of anergism.

An university president tells me that at the present time an endowment of thirty million dollars would allow his university to develop ideal conditions. As a matter of fact, that amount might all be used for one department of the university, but that department would be forced far ahead of the times,—out of proportion. The balance of nature must be kept in education as well as in increase of animal life, and for that reason no one university is allowed by nature to receive endowment sufficient for developing ideal conditions at the present time. We must still allow the eagles and hawks and owls of ignorance to prey upon innocent and valuable ideas which would otherwise increase out of proportion to the supply of good food which these ideas require, and which they would take away from other ideas not yet strong enough to hold their own.

At the universities, professors in the field of the humanities do not obtain such perquisites as go to the engineer, physicist, or chemist in the way of outside engagements. This will

always necessitate large endowments for the support of the literary side of any university.

In educational institutions each member of a faculty feels that he is extremely important, and he is apt to rebel against rulings of the president and board of trustees. Instead of this being an unfortunate matter it should really be encouraged on the ground that it indicates a high degree of interest. It is difficult indeed for the president and the trustees to encourage and promote without sufficient funds, and equable disposition of funds is not always pleasing to heads of departments who appreciate the weight of urgent needs of their respective departments.

As a student I had a general idea that the president of an university was free to exercise his preference or prejudice in relation to government and administration of the institution. In later years, when serving upon the board of trustees a great university, I became impressed with the enormous difficulties, requiring exercise of the sort of wisdom, knowledge and diplomacy belonging to a president of the United States before an university president could effectually realize a wish of his own in many instances.

In earlier years I had a general idea that a railroad company simply took in money at the stations and expended it in maintenance and progress of the road, and in paying dividends to holders of its stocks and bonds. In later years, I became director in a railroad company, and found that strike bills, venal legislative committees, fake damage suits, obstructions through public prejudice, and rate competition by other lines, made the mere taking of money from passengers and freight and expending it upon maintenance and development seem like such a small matter that it needed only the attention of a clerk or two. There was some question if in joining the directorate I had not joined the criminal classes.

I had a sort of general idea in earlier years that a banker could take in money at the receiving teller's window, make good and wise investments and reap his profits mechanically. In later life when associated with corporations belonging to banks I found that the great questions to be managed by president and directors required genius of the first order, and it was wonderfully easy for disastrous mistakes to be made.

Every college faculty has a few geniuses who would force progress if nature were to allow it, but nature brings jealousy and other traits to bear.

Geniuses are often forced out of teaching institutions because of the difficulty of the president and directors in being quick enough at noting the insidious influences which are at work against supermen. I sometimes think it would be better to place at the head of a university some business man who could not spell pedagogy, much less pronounce it correctly. He would be untrammelled in protecting the superman who would bring greatest fame to his institution.

The people of the country at large can tell the president and trustees of a teaching body whom they should put in teaching positions and keep in position, notwithstanding all local machinations. The trustees and president cannot always see clearly because of the small politics in every institution. We cannot leave the question of employment of a genius to the decision of a committee of the faculty. The high priest Caiaphas was chairman of a committee of the faculty.

With the faculties of every educational institution internal politics always has a tendency to weaken the whole structure, like the internal conflicts in Albania or in Austria. Men of national and international reputation who are devoted to their fields of work rather than to self protection, are sometimes thrown out of position, to the great injury of institutions, because of management on the part of men who plan better for

themselves. The governing boards are apt to be misled, unless their solicitude for the welfare of an institution is so great, and their methods of criticism so well ordered, that they are open to large views, and are not influenced by the policies prepared for them by self seekers. Men who are least worthy of position are frequently conscious of that fact and exert themselves with more persistent effort toward obtaining positions which naturally belong to men of larger scope of mind. The affairs of a great institution sometimes grow beyond the focal range of men who are in charge. Great men are seen in their full roundness only with the telescope. They so darken the field of the microscope of institutional politics that no one can outline them. There is sometimes a genius acting as president of a teaching institution, who has telescopic vision for selecting teachers and keeping them in position against opposition. He disturbs the balance of nature by bringing to his institution more students than the endowment will care for. Several American institutions came to mind in this connection.

One way in which nature prevents too rapid progress is by setting every one at attacking a genius. The genius shoots ahead of the multitude like a green sprout growing out of proportion on a tree. Every large educational institution has among its teachers one or more real geniuses. The geniuses are naturally objects for attack, and nature sets others at attacking them when they attract attention. In this way most geniuses are kept under control, because they are not skilled at protecting themselves. Instead of fighting effectively they are very apt to be kept in check. They themselves are usually unaware of the fact that they are geniuses. The fact is recognized by their colleagues, and nature sets these colleagues instantly at work to nullify abnormal influence in order to prevent too rapid growth of one institution. Now and then we find an educational institution in which the whole board

of trustees as well as the president will protect a genius against his colleagues. When the governing board is effective in this matter, such an university makes very great progress in growth of that particular department. For the most part, however, the methods of colleagues are sufficient to keep geniuses nipped in the bud. In great educational institutions, as in factories, the men who are in control often recognize the genius and protect him, to the great advantage of the institution,—the genius himself seldom being well fitted for self defence.

No one would ask a teacher of mathematics to show sound judgment in practical affairs. He is unfit for that because his mind is concentrated upon the minutiæ of symbols. In his place he is invaluable, but we have no delusion about his ability to manage the business of a railroad or even of a grocery store.

A professor at college who takes himself too seriously and sees nothing but the great importance of his own subject, forgetting to have a visit with the training master of the crew and the football captain (if he has standing which admits him to their presence) has to carry his load of knowledge all alone. The boys would become eager for his teaching if he could show them points of contact between Dante and a single scull race, or between calculus and a football game. Such points of contact exist. The best teacher may not be the one who is most learned. He is the best interpreter of that part of knowledge which can be assimilated by the people, and who makes contact points with their enthusiasms.

How many times men have said to me, "I always wanted to have a college training, and it is the regret of my life that I did not have one." These for the most part have been highly educated successful men. In all probability they had stored up in mind quite as much good material and had become as efficient citizens as if they had taken a college training. The

mind is always at work; and a man who is seriously devoting himself to progress will probably advance as rapidly without a college course as with one, the only difference being that he is likely to be less well rounded.

Any subject on earth if followed far enough would include every other known subject. When the interest of a man of studious nature has become engaged in any subject his learning may become wider and better chosen,—which is more important—than that of other men who have been given the best of college opportunities. Men who know what they wish to acquire and who remember because they wish to remember, seldom become smooth, well-rounded doubters,—a common product of the universities. They wanted what they obtained and that placed their learning in the positive group of efficiencies.

A man without a college education may even succeed better in business than he would upon the basis of a college course. It is a matter of the individual after all. I know many men who have studied just what they wanted to study in later life, and who acquired much more information than was acquired at college by men who did not at any time perceive a real need for what they were studying.

Allied with the feature of men acquiring an education beyond their ability to utilize it, we may note a harmful influence in the professions, and this is particularly true of free higher education, when men who are not particularly adapted to the professions prepare themselves for such work. We have large numbers of young men coming from families in which ideals are those of business, and there is a direct jump from the money lender or the sand contractor straight to a profession, without taking along that intangible home influence which in times past has guided men toward the professions as a matter of choice. It really requires two or three generations

of polite home influence to prepare men for the spirit of a liberal profession. A jump into the professions with business ideas for guidance has a demoralizing effect. A high sense of ethics is quite as essential in the better sorts of business as it is in the professions, but very many of the young men, particularly those obtaining the free higher education, come from a class in which unscrupulous business methods are most often observed at home.

Conditions at universities represent the conditions of national life very largely. Universities have perhaps been illustrations of social development rather than institutions for actually establishing higher standards of living, but a change no doubt will come with increasing need for fixing standards. Growth has been so rapid that we have not as yet placed the universities quite high enough above the mob.

A snobbish element will always be in evidence at the universities, no matter how much progress we make culturally. The reason for that is because young people of university age are in their transition stage between the protection given at home and the protection given by liberal views won out of experience. In the meantime, youths are as callowly intolerant and uncompromising as any other healthy and normal young animals which have not learned how to protect themselves excepting by exclusiveness.

If one steps into the Board of Education Building of any large city, he will not be permeated by any circumambient aura of education. He will be impressed rather with the rudeness of the shop. All of this means—like methods of the clergy for obtaining position, that it becomes necessary for men to reduce everything to method, and when doing that the men who are best adapted for method take charge of affairs.

The present methods of school and college work give us more and more culture and less and less physique. The relative

proportion between the two must continue in a way, and will hurry to the end our present cultural period, unless we get into diplomatic understanding with the microbe. Fresh accessions of strength will continue to pour in from the country, but at the present rate of development of cities, the last Americans will get into the bonfire at no very distant century unless conditions change. In the cultural history of different nations mental culture has gradually taken the place of physical culture. The foremost students have been the ones who oxidized their toxins least—taking this as a general statement, and have brought their families to a close.

It seems to me that educators of this century must awaken to the danger of demanding so much study of boys and girls, that not enough time is given for oxidizing toxins. They are crudely following a desire born of vanity to have children follow prescribed curriculums that will force them rapidly to the higher culture planes of to-day. The minds of children are certainly being trained at too great cost to their bodies. There is no doubt about it at all. I have watched very closely indeed certain girls and boys who are ambitious to stand well in their classes and who do not have time enough left for taking that vigorous out-of-doors exercise which is necessary for oxidizing their toxins. Their protoplasm is becoming so highly sensitized that it will result in cell injury for themselves and for their descendants. Many children who are naturally endowed with excellent constitutions hunger like other animals for oxygen and for out-of-doors life daily. Our system of education, hurrying children along toward higher culture planes, works permanent injury to the race. Some of us who are parents seriously ask if it would not be much better to guide the children toward a mean culture plane which will be compatible with a high degree of health, and to let children run wild more than they do at present. We may well

ask if the acquired education of high degree is fair compensation for loss of physical power. I wonder if Diana or Venus ever sobbed in their handkerchiefs because they felt compelled to study at night rather than to romp about over the peaks of Mount Olympus in the bewitching moonlight.

Enormous waste might be stopped if teachers were to go to the summer resorts and make up classes in nature study. The teachers would not only make a summer income and have a good outing at the same time, but the children would become intensely interested in collecting specimens, and imbibing the knowledge which would lead to a hunger for collateral knowledge. Summers which are largely wasted by children at the resorts could be turned into splendid account if the schools or teachers would plan such vacation occupation.

If some way could be arranged for having groups of boys in every village and city meet each other in natural history study, a tremendous amount of energy would be turned into right channels. That sort of thing keeps them from the saloon and engages the mind so fully that little incentive remains for turning in unprofitable directions.

A capitalist having enjoyed the sport of playing a winning game and not knowing what to do with the money, may go incognito to an academy of sciences and remain in the pupa stage at such an institution for a year. At the end of that time he will find beautiful wings bursting forth in volume from his thoracic segment, following liberation of the head.

My friend Dr. Bigelow, editor of the *Guide to Nature*, comments in his June number upon the difficulty in getting young people to definitely study nature. He quotes editor Clute, of the *American Botanist*, who has called attention to the increasing general interest in nature, and to the collateral fact that with all this popularizing, the great mass of the public does not go directly to nature, but prefers to get it from

specialists. Children have to be towed along by some tug of an enthusiastic teacher, instead of learning to sail independently. Dr. Bigelow thinks there is too much competition from movies, nickelodeons and dancing pavilions, and he asks if anyone can explain the lack of sustained, independent personal interest in nature study.

Responding to the query, I would remark that most people and particularly the young prefer to have some one else manage even their movies, nickelodeons and dancing parlors. This is evidenced by the fact that at the Congress of Motion Picture Exhibitors, recently held in New York, the chairman of the executive committee stated that the daily show attendance in the United States now averages ten millions. This means that a message of any sort may be brought home more quickly to the people through the influence of moving pictures than by any other means. Educators have not seized upon the fact so quickly as it has been observed by those who introduce emotional suggestion for dime purposes. The question of getting young folks to engage in nature study may be taken up seriously, however. People are first guided instinctively toward the three primal comforts; sexual, social and economic. Entertainment and occupation which lead toward marriage, toward social position and toward securing a competence, insidiously engage first interest and persistent interest among all members of the public.

Individuals who have accomplished marriage and who have secured social position and economic comfort, have been obliged to develop a considerable degree of skill in the process. This has required an employment of the deeper layers of thought, to the exclusion of subjects which were not held to be directly relevant.

Having achieved success through the exercise of acquired skill, people are usually by that time past the years of greatest

receptivity. They might take up the study of nature (and some of them do take it up) but in the course of securing the primal comforts they have developed a certain degree of pride in method. Vanity then takes charge and impels them to compete for social and economic excellence of a superior sort. The reason for this is because their training has all been along lines of natural inclination. That in itself is a variety of special natural history study. When competent teachers can show that a general interest in the study of natural history actually may lead to earlier and happier marriage, to more secure social position, and to especially good economic position, young folks will turn to that subject very early. As a matter of fact, the study of natural history will actually do precisely what I have prevised. We are simply not quite far enough along in civilization as yet to realize this. Teachers in the monistic unity state will explain to people the reason why the study of natural history is the most direct route for securing the three primal comforts. Teachers will inform their pupils that methods of the nineteenth century for securing these comforts were crude but evolutional, and represented progress over the methods of cave-dwelling days. Pupils will be told that people were prepared for natural history study as a foundation for all sociology as rapidly as they could make use of their knowledge. In the monistic unity state a child will be taught to be cautious about following masters. A little oak growing in the shadow of a big oak gets to be very tall and thin at the top, in its struggle to compete. When following the development of a master oak the little oak never does get to be much of an oak unless the master oak is removed. Set the little oak out by itself, and set the child by himself, telling him to beware of masters just as soon as he has obtained their spirit.

According to our present system of education we take the

boy away from what he wants to do, and then not knowing what to do with him, put him into some profession or business for which he has no enthusiasm. Let a boy do what he wants to do and his eyes and ears will be wide open all of the time, and his mind alert.

In the monistic unity state the question of education of children will begin with observation of the natural plane of rotation of a child's mind about any subject whatsoever. This will be followed up with little touches on the wheel for the purpose of increasing velocity. A mother said to me in response to an expression of this idea that if her boy were left to his own inclinations he would do nothing but go fishing. I replied: "Good enough! Every subject runs to infinity and incidentally touches every other subject on earth in the course of its running. In order to educate a boy you must first catch your boy. If his interest is engaged in fishing, his interest is engaged in something, and that is enough for a beginning. Teach your boy how to make a study of fishes and of baits. That will start him well into natural history. In order to classify different kinds of fishes and to read ancient authors upon the subject, he will need to know Latin, for which he will perceive a definite need. Make him keep a diary and write up notes about fishes, and enter into correspondence upon the subject with other boys at a distance. He will then become much interested in spelling and orthography. All branches of learning may be hooked on to his revolving interest in fish, and made to rotate with it. He may incidentally find his interest enlarging centripetally into some particular one of the branches of science and that branch may be followed into some other occupation, but all of the while with interest, and that is the main point. The world needs many thousands of boys, however, who will stick to the subject of fish pretty closely. Great problems relating to the food supply of the world belong

to Ichthyology, a subject which as yet has been barely scratched on the surface. If your boy were to specialize upon some one fish, let us say for instance the dog fish (Squalus), he could find ways for supplying the world with millions of tons of cheap and excellent fish food and at the same time would conserve the supply of other edible fish which are now destroyed by these dog fish. In this one special field alone he could not only become a great public benefactor, but might incidentally make a fortune without much difficulty. If he becomes interested in the science rather than in the business of fish, he could make an honored name and occupy, perhaps, an important government position or a teaching position, from which his name would go down to posterity,—if that latter vanity happened to interest him, as it probably would not,—not if he were devoted to a life of usefulness and science. Sufficient unto the day is the vanity thereof. My friend Mr. Blackford made a fortune, gained an honored name, contributed to science, and lived as a public benefactor because he cared to do nothing much beside going fishing as a boy, and because he cared little for other subjects that were not collateral to the subject of fishing as he grew older." The boy who is headed toward a profession or a business in which he has little natural interest will work only at such times as are prescribed for attention to the job. His mind at other times will be upon other things, and the "other-times mind" is the most important part of any one's mind because that is the mind which exercises synthetic control over the analytical part of interesting work. If the boy's "other-times mind" is not engaged in synthetizing the analytical facts of his uninteresting job work, the boy's great inherent forces are working in opposition to each other. I merely happened to think of the dog fish to employ as a special example. There are very many other fishes of which as much may be said. Incidentally perhaps it

is worthy of remark for those not familiar with the subject, that the sea dog-fish (Squalus), the lake dog-fish (Amia) and the amphibian dog-fish (Menobranchus) are all valuable for food purposes. Because someone's imagination applied the name dog to these species prejudice was immediately aroused, and on account of this prejudice the world has suffered enormous loss up to the present time in connection with these species, in two ways: (1) through failure to utilize them, and (2) through allowing them to increase destructively when other kinds of food fish were depleted. So long as man prefers prejudice to provender, his destructive sin of omission in failure to make use of three aquatic food resources that carry the appellation "dog," will continue in destructiveness.

In the monistic unity state, when pedagogy has been made the second science, I would not have each one of the teachers follow a boy or girl all day long. That would have a tendency to keep the boy or the girl out of mischief too much, and they would not then be really and truly boys and girls. Aside from that, about ten teachers would theoretically be required for each boy and girl, and services of the desirable sort of teachers would command salaries of such size that, according to our present-day methods of reckoning values, the procedure would be impracticable. I would simply have the chief teacher form proper concepts of the peculiarly desirable tendencies of a boy, and then by suggestion in the morning set his general course for the day. The teacher should be a quadrant. The experiment of really having boys followed by wonderful teachers all day long has been tried in foreign courts, and has resulted in shaping characters like that of King Blank,—perfect in social form, a bully good fellow at heart, yet abounding in undesirable social characteristics and seldom stimulating to the forces making for uplift.

Under the present system, imaginative children are often

called dull in their school work, and yet these will be the favorites of the teachers in the monistic unity state when pedagogy is made the distributing science, second only to bacteriology, the producing science which has charge of nature's first law and must stand first.

In the monistic unity state punishment for children will be thoughtfully planned. The children will do dreadful things, exasperating at times, but they will mostly live through their experiences. At the present time parents are mostly living through them.

In the monistic unity state the words "don't," "can't," and the whole series of negatives in fact, will not be allowed excepting for such people as have been instructed upon the subject in their youth, and who understand the range of effects of employment of negative expressions in speech.

In the monistic unity state the school teacher will call the psychologist in consultation when laying out plans for Tom, Dick and Harry. The psychologist will say: "Now, Tom, my boy, you are of the mental temperament and will stand near the head of your class without much difficulty. Your chief danger will lie in a tendency to neglect physical exercise. Toxic influences will then injure your protoplasm, and that may lead to your skilfully giving wrong impressions to the world. The toxic scholar is particularly injurious because people naturally trust scholarship *per se*. Beside that, you will have a tendency to bring your family to an end. The world needs a great many men of your mental type. So now run off, Tom, my boy, remember about oxidizing your toxins." "Dick, old fellow, your temperament is motive in type. You must plan to stand about the middle of the class. Too great an effort to stand with Tom will carry you up against the law of diminishing returns, and that will never do, because your own temperamental qualities are too valuable to be wasted in

effort at fitting into another temperament. Should there be waste of energy in attempts at standing with Tom in scholarship, you will be tempted to play hookey too often by way of compensation. Keep a good average position near the middle of the class and you will then play hookey only when you feel that it is absolutely necessary to do so. The chief danger belonging to your temperament will rest in attempts at ambitiously fitting yourself into other temperaments. You must bear in mind the story of Gregor Mendel, who discovered and formulated the laws which bear his name. As a boy he was turned into a clerical career because of poverty, but in his theological studies and in examinations for the position of instructor, he failed in all of the branches. He gave up trying to be a teacher or to engage in parochial duties, and retired to his seminary as a monk. In the little garden of this seminary he learned and recorded the laws of heredity that have given him for all time a place in the very first rank of scientists. Had he been a scholar of rigorous thought, devoting himself to philosophical questions relating to the human worth of science, he would probably have been laid aside in the vast graveyard of rigorous thinkers. So remember that your own temperament is just as good as Tom's, and quite as valuable in the world's work, but only when followed to its own natural temperamental conclusions." "Harry, old chap, your temperament is of the vital type. You will have to stand near the tail end of the class, but hang on and get past as many examinations as you can. Association with Tom and Dick will give you a good appreciation of the different characters which are found amongst men, and you will need to know as much of books as you can acquire, in order to manage large affairs. What you are to acquire is a sort of general knowledge of knowledge, and that will serve excellent purpose when you get into politics or responsible

position in business. Try to stand with Dick in the class. Work hard but do not attempt to emulate Tom's scholarship. That would mean poison for your nice tender pink protoplasm. You have two chief dangers with which to contend. Your pride may be injured as the result of futile attempts at standing with Tom in the class, and that will have a tendency to give you a feeling of inferiority. Such feeling, belonging to the negative side of life, is destructive and is to be avoided under all circumstances. Be careful to avoid anything leading to a feeling of humility. The symbol for humility brays when it tries to give expression to pent-up feeling. You promise to be as big and valuable a character in the world as Tom or Dick. Do not forget that. Hang on to the class as long as you can, go as far along in college as possible, and then when the time comes for getting into affairs your equipment will be as fine in its way as the equipment of Tom or Dick, even though you cannot remember the principal parts of *Eimi*. Your very great danger will belong to good-fellowship. Good-fellowship has a tendency to take men away from all other occupations, because it represents response to one of the strong fundamental instincts of a gregarious species. With a man of your temperament there is always a tendency to specialize upon this instinct. Be on guard against specializing in good-fellowship. You and Tom will both need to observe the natural tendency of Dick in order to preserve a good mean position in good-fellowship, but you and Tom will approach his position from opposite directions. It will require much effort of the will for both you and Tom to become good fellows of mean type."

Among the statistics recently taken relating to Yale University it is shown that the men who did not graduate have been quite as successful in business and in the professions as men who did graduate. These statistics may probably be

read as indicating that geniuses and exceptional men commonly find it very difficult to adapt themselves evenly to prescribed systematic courses. Such a rendering would be in line with the belief that ideal education consists in fitting out every individual in accordance with the talents belonging to his temperament. Many educators know how desirable this would be, but how difficult under our present methods with the resources which are at our command.

Investigations under Doctor Charles C. Brown in the office of Secretary Stokes of Yale University have recently been published showing the relative proportion of graduates and non-graduates who have gained position in life during a period of fifty years. About one-fourth of the students who came to Yale in the course of half a century were not graduated. In some pursuits there are more non-graduates than graduates who have been successful, and in nearly all pursuits the percentage of men of position is higher among the non-graduates. The following table shows the percentage of non-graduates and graduates among the professions.

	Non-Grad. P. C.	Grad. P. C.
Art, architecture and music	4.8	1.4
Education	10.2	11.4
Engineering (including forestry)	6.5	9.7
Farming and ranching	3.4	1.8
Finance	9.5	9.7
Government	2.9	1.3
Journalism and letters	3.5	2.7
Law and judiciary	10.2	24.4
Manufacturing	10.7	9.8
Medicine	7.9	8.7
Mercantile business	16.8	8.3
Ministry	10.9	8.2
Science	.9	1.2
Transportation	1.8	1.4
Total	100.00	100.00

The discovery that in government affairs, in public life, in manufacturing, in mercantile life and in the ministry the percentage of non-graduates is higher than that of the graduates is a surprise. In art and architecture the percentage of successful non-graduates is three times as great and in farming twice as great as among graduates. The percentage of men of position who were not graduates does not indicate that men should not go to college. They are to hang to the class for as long a time as possible and stand as high as possible. When following any studies, they are to remember the documentary evidence in support of the possibility of their being the exceptional men who are to win great success in life in later years, even though they could not fit themselves to an established curriculum which really represents the best that can be afforded at the present time in educational methods. We must remember that all of the non-graduates had the great advantage of at least a partial course. They imbibed the spirit and the methods of learning, even though prescribed methods did not fully meet their requirements. The ones who failed to graduate will probably state that the part of the college course which they did take was invaluable, and the real basis for their success in life.

It is interesting to look back upon college days and to note the courses in life which have been followed by different friends of those days. Some have gone out to wield immense power; while others have remained almost stationary;—there is a great big wide world into which they have never expanded. There have been many surprises. Some of the best scholars, and the men most highly esteemed in college days, have remained in some vise, while others who were not at all proficient in their studies have become powers of national or international consequence (not a necessary corollary to dulness). On the whole it is probable that the largest number

of exemplar type substantial citizens would be found among the graduates.

The tendency of to-day is to give position in various occupations to men who pass rigid examinations. The effect of this will be to fill positions with men of the mental type, and this type is not always the one for best efficiency in expansive idea which leads to greatest reward and to greatest failure. Our present system which is now developing belongs to the conservative protective course of a ripening nation. One reason why more business men prefer to have no college men at all in their employ is because these business men are quite as ignorant as the educators themselves in regard to primary selection of men for best efficiency in special work. We are all very crude in this matter at the present stage of our cultural period. We shall be still more crude one hundred years from now, however, because at that time so many more vistas will be opened than are open at present. The time will never come when a father who has graduated from the university will be able to pass his son's requirements for entrance into the freshman class. On account of our competition system for men who are to fill various positions in public and private service there will always be a tendency for our cultural period to come to a state of rest. Men of the mental type will pass the best examinations and, being prone to devote themselves to philosophy, will at the same time have a tendency to take an insufficient amount of exercise for properly oxidizing their toxins. China furnishes an object lesson. Almost every public position of importance in the Chinese Empire is filled by a scholar. Scholarship is an idol in that country in which many students break down physically as a result of their efforts. The chief subjects in which they are examined relate to philosophy. Philosophy deals so largely with the past that men in public position who are scholars make their philosophy

comprehend all questions, and they consequently have a persistent tendency to remain in the past and to bring knowledge to a state of rest. Even in such an ordinary matter as the police service in America it is a question if men of mental type who pass the best examinations are necessarily the best policemen. Men of the motive or vital type are particularly apt to have the bravery and courage which go with a strong physical constitution.

During the nineteenth century psychology was mostly a plaything for metaphysicians, but in this century it is being put to very practical use in the field of psycho-technics. Various laws of anthropology, physiology, anatomy, biology and ethnology have been correlated for the purpose of fortifying psychology, as applied to the business of large corporations. These corporations now have the privilege of employing an expert in psycho-technics for the purpose of making selection of employees. Up to the end of the last century this selection was usually made by a foreman who was frequently self-important, and a grafter who took blood money from men seeking employment. His selection of men was often haphazard and dependent upon caprice, personal notions or underhand methods. The psychologist, who now applies psychology in technical application, may select men all the way from heads of departments down to ordinary laborers according to the principles for making pretty accurate assessment of character and of capacity. The man of mental type is referred to the bookkeeping department perhaps, the man of motive type may be profitably tried out as salesman, and the man of vital type belongs at the head of some department. Characteristics which go with the physical constitution of each individual of the various types are taken into the problem by the psycho-technist. He knows that the blonde is apt to be a rapid worker, to overlook obstacles and to force himself and

others right along. The natural faults of the blonde are known. He is apt to jump at conclusions and make mistakes and not be as dependable or controllable as the brunette, who makes more sustained effort in a less brilliant way, but is more dependable for an employer's purposes. In fact, all the physical characters, the shape of the head, the shape of the hand, all have meaning to the one who is making selection of employees for prospective positions.

The industrial feature is an extremely important element in the school. Teach a child to make a basket that may bring him fifty cents and his whole eager attention is directed and engaged. The child wants to make that fifty cents. Having gone this far it is a very easy matter to teach a child the names of things which go to form the basket. Tell him where all the parts came from, and then he will wish to know about the country from which they came. Tell him about the chemical and physical structure of a withe of willow and about the original function of a strand of raffia; tell him about stress in relation to materials. The teacher who knows everything that may possibly be known about a basket knows everything that may be known in the world. It is the tangible fifty cents which brings all these questions within the range of eager interest of the child. Tell him of some future demand for results of study—in the absence of any present basket for holding attention, and he may postpone enthusiasm until just before that future arrives.

Boys, like other young animals, fight naturally in order to determine questions of leadership. There is no reason why one should attempt to change nature's plan in this respect. It is best to teach boys the art of self defense, and when they are known to have skill at that, they are pretty sure to be left undisturbed by other boys. It seems to my mind the best way

to deal with the question. G. Stanley Hall says in effect that there would be great danger in allowing carefully trained boys to associate with the untrained if the vicious boy were commonly chosen for a leader, but he is the one who is not chosen. The leader is generally a frank and enterprising boy with good temper. His degree of courage is invariably tested by other boys. If he can "lick the bully" he is leader indeed. Every boy should be taught the art of self defense with his fists, and knowing his power, his natural tendency will be to become magnanimous, with the desire to use his skill not for bullying, but for protecting himself and his chums. The leader is a boy who makes no false pretense, for boys like nothing better than to haze the pretentious youngster who is in their midst. The experience of the adult world is very little different from that of boys. If boys are trained among boys there will be little clumsy falling from the perch when they begin to fly in manhood. If we are to develop eagles that are to fly toward the sun we must not adopt methods which will shield them from harm until they are old enough to fly, for their method is then likely to be that of bats—crookedly after dark. The innate sense of justice is greater with boys than it ordinarily seems to be, but is shown in their regard for a leader with justice as his chief characteristic. Children are quick at making inferences if they are given suggestions. They are equally quick at resenting things which are taught them under any sort of compulsion. Nothing appeals so quickly to a boy's pride as to let him feel that he is influential. If the fact that he is influential is brought to his mind by older people, the compliment strikes him deeply. Laziness is really the principal enemy to active virtue, and it is the defective boy who is lazy and never chosen as a leader. Talent and genius are the inspiring agencies in adult life, but leadership in particular is an impelling agent for most boys. Warn-

ings, scolding, urging, are like difficult blowing of a fire, but if the boy is shown that he has talent for natural leadership, he then develops a sort of self-sustaining combustion. It is a question if the boy who is brought up wild in the streets is much worse off than the boy who is trained to manhood under the noblest feminism. The rude standards naturally adopted by boys are quite as safe as feminine virtues which do not make an aureola about masculine ideals. Boys who are taught conduct from the finest feminine standpoint emerge into an entirely new field of thought when developing into men, and they are untrained for masculine modes of conduct. Robust manhood is best developed along with teaching of boys by men, and at the present time it is unfortunate that the emoluments and pay of teachers do not attract the best men on the whole.

It might be well if every male teacher could have an income of fifty thousand dollars per year for a couple of years, in order to allow him to perceive the futility of attempting to find that sort of income satisfactory. Responsibilities would at once increase. A teacher would find that no particular satisfaction really inhered in that sort of income, and he would thereafter be kept contented with his life work and a small income. A man is left pretty much alone when it is known that he is barely making a living, but a multitude has its eager eye upon his surplus. There are relatives to be supported, boys and girls to be sent to college, noble charities and civic duties calling for his attention. Investment is to be made in enterprises which will divert his attention. Old friends will fail in their undertakings unless he goes to their rescue. A man with a surplus and a soul is promptly taken in charge by a public which leaves him alone before the surplus becomes salient. At one time I fancied that an annual income of twenty-five thousand dollars would make me supremely

happy, but when my annual income had reached that figure, I began for the first time to lose that life-joy which had previously kept me feeling boyish and elastic. There are men teachers who are wholly superior to questions of income, but not all, and the subject is of such vital importance to the state that the state must eventually take charge of the question. Who doubts but the people surrounding the court of King Charles II had the best teachers who were procurable when they were children? What did they show for it? In a gregarious species the habits of the species are best learned in the days of youth under proper tutelage, but this tutelage must come chiefly from actual experience. Actual experience is what boys and girls hunger for, rather than ideals which are the fruit of experience of older people. Boys and girls need teachers of their respective sexes, and ones who have had nearly similar early experiences.

There is no doubt but certain forms of strong suppression are required in the training of boys, but a high degree of training is required on the part of the teacher who is to apply suppression, and not have it represent his personal feelings rather than the needs of boys. Denunciation must be classed in two entirely different forms—censure and scolding. Censure is desirable when checking carelessness or wilfulness, but scolding usually defeats its object, because it serves chiefly to liberate an excess of discomfort on the part of the scolder, in destructive negative form of expression.

The true character of a boy is usually forced out pretty directly when he is put in a predicament by an imprudent teacher. A very bad boy takes a mouse to school in a box and sets it loose during prayer time in the school room. (In my case it was a striped snake.) The teacher asks a good boy, who did not set the mouse loose (because he did not happen to have one), if he knows who did it. The teacher

then becomes a character press. If the good boy tells the teacher the name of the mouse boy he is held up in contempt, and very properly, by other boys who retain primal clan spirit,—still being barbarians. They despise a tale bearer of any sort. If the good boy says "No!" he tells a lie, thereby introducing a seeming contradiction. His telling of a lie means a fault on the part of the teacher, if you please, but it is in response to her imprudent action upon a weak character. The boy who tells a lie in order to protect his clan is phylogenetically one step higher in character than the boy who tells tales. The boy of true blue character, however, the really right sort of boy, says to the teacher, "Yes, I know who set the mouse loose, but I prefer not to tell." This same answer will save the bad boy if he is lucky, and the teacher simply asks the bad boy if he knows who let the mouse go. He is in trouble, however, if she asks him directly, for then there is no escape excepting to tell the truth. The boys' clan is an organization which is under domination by the teacher through force of natural feudal conditions.

We must distinguish between a deliberate lie and a false statement due to rapidly growing unbalanced imagery. The child who tells no lie is a hopeless proposition because of the dead level of his sodden imagination.

Punishment of one man by another in private affairs comes under the head of warfare, brutal in conception, and destructive to both parties through waste of time if nothing else. Still quoting Hall in outline, punishment of children and of adults should be wholly kindly, and conducted wisely and at the right time for correction of weak or perverse wills. Strong wills are so valuable that much effort must be made by teachers to train such material, instead of trying shorter methods for the purpose of saving time in the management of strong-willed children. Blaming should not have for its object relief of

feelings of the blamer, but should have for its object calm explanation of the right way which will appeal to the understanding of the blamed, and allow him to make fair response. Forgiveness must be classified under two heads. Forgiveness of men who are enemies to good principles is cowardice unless these men are irresponsible defectives. Forgiveness of personal enemies is generosity, perhaps bravery. Consequently forgiveness cannot be considered under one head, but must relate to either cowardice or bravery.

It is wrong to remind children of their defects or peculiarities excepting in a guarded way. Sensitive children are often seriously injured by the suggestion of inferiority and of defect, which may increase through the influence of suggestion instead of being overcome. The child is apt to live up to the suggestion of any one whom he considers to be an authority—which means almost any older person. If the authority suggests love and nobility of character the child will get to find the world full of sunshine and of stimulation to endeavor. Self-confidence in the child should be encouraged in every possible way, but this in its turn may become a vice after children have become able to care for themselves—and what is needed in the way of suggestion to help the child, becomes flattery with bad results as the adult stage appears.

Almost any one can look back to chance words of cheer, to chance acquaintances, or chance incidents that have deflected his life course distinctly. The child of good physical mass, given sufficient educational momentum and ordinary velocity, will stand many deflections and keep in the right general course; but the child of high mental velocity and small physical mass—the genius—is quickly and unduly deflected by chance. His upward or downward movements in life are extreme in degree. In the so-called Bohemian group of city life we find a great heap of geniuses that have been deflected downward.

Many of them when picked up, recast, and fired again, take a flat trajectory.

The triumph of virtue over vice has been the theme of so many writers of plays that it is hackneyed indeed, but it belongs ever to the present school as well as to any of the past. When pedagogy comes to be recognized as second in importance among the sciences, children will be told that suggestion is the really most worthwhile character in pedagogy, and their own dual natures the target subject against which suggestion is to be shot. They will not have to take part in brutal combat between virtue and vice with the aid of a Xenophon's army of writers on the subject. The kindly gentle sunlight of suggestion properly directed will open their buds into beautiful flowers in a way which cannot be done by the literary army.

A morning talisman to give a school boy, and perhaps to some older people, is this: "Is someone to be better off to-day for knowing me? Is someone to be worse off to-day for knowing me?"

My early school days at the little red school house in Westville, Connecticut, were spent among typical village boys, and later, in 1869, I was sent to a boarding and day school, an academy at Nassau, New York, where there were boys from the country and from the city, from near-by farms, and from Cuba and Canada. Some of us played hookey, stole apples, and climbed down the rope ladder to go on straw rides at night, risking awful dangers if the principal found it out. We slipped down to the creek and went fishing after church when we were supposed to be reading Sunday School books. We went swimming, against the rules—fought and swore, and would have smoked more than we did excepting for the unkind nausea. We were impolite to the girls, and played tricks on such ones of the teachers as deserved it, and I fear upon some

who did not deserve it. Looking back now upon those days, if there was any boys' mischief in which I did not have a hand I would like to go back and try it all over again, so as not to miss anything. And yet, out of all this experience I gained a knowledge of life that seems to be rather free from nonsense—a knowledge of boys that would never have come through the more dignified experience at Hopkins Grammar School in New Haven later. At the latter school my playmates were of a very select student class, and nothing but scholarship and good behavior were in the atmosphere. At boarding school I always stood decently above the middle in class work, but never was the best scholar, nor even the worst boy, the latter position being held by a boy who became a distinguished judge later. His experience prepared him for becoming an expert in justice. At the Grammar School there was no such opportunity for becoming fully acquainted with boys. Tone was given by the vibrations of college spirit near at hand. Beside that, many of the boys were interested in natural science, to which they devoted spare hours and vacations, and my thoughts were then diverted toward natural history and preparation for what seemed to be the best college course in that field of work. After my fourteenth year every influence was toward serious work, and I never would have known real boys had it not been for the conviction of my parents that boarding school in the country was the place for learning first principles relating to a species which had the gregarious habit, and to which habit one would be obliged to adapt himself through life.

A man is hazed throughout life for the very qualities which lead to his being hazed when a boy at school; but at school it is done frankly, while in the world at large it is done insidiously. One may better take his frank hazing at school, otherwise he remains a mass of dentable protoplasm which is always

inclined to sink into some crevice where it can escape the denting.

A great newspaper ado is made when any one is injured in hazing, but in all probabilitiy more harm is done by rules which absolutely prevent it. Hazing seems barbarous, and yet it is response to natural law in a way. The self-centred, self-conscious boy at school, the one who perhaps has been the pet of parents, is not ready for adjustment until his corners have been polished off so that he will run in ball bearings with his fellows. Boys who are hazed the most as a rule are the ones who need it most. I was pretty thoroughly hazed at school, and if my parents had gotten hold of the fact, they might have made indignant outcry; but there is no one for whom I have higher esteem to-day than for two or three of the youths who rather forcibly ground off some of my corners and allowed me to run in ball bearings with the crowd. The boy who is not a natural leader but thinks he ought to be, and the boy who will not run with the pack because of self-centering are not very valuable members of the social organizations of a gregarious species of animal.

At the present time there is a tendency to drop Latin and Greek out of the required studies in many courses at the universities, but I am old-fashioned enough to think this a mistake, even for men who are to have so-called practical training. The chief value of Latin and Greek, so far as my own experience is concerned, is in giving a richer and fuller meaning to words. It is not so often necessary to puzzle over the meaning of a word or to use it arbitrarily if it contains a familiar Latin or Greek root. These roots instantly make such words grow and blossom out into things of beauty or of usefulness when warmed by one's interest.

Teachers assume a great responsibility when giving direction to the reading habits of children and making a choice of

their literature, for in later life it is seldom practical to make any attempt at changing the character of any one's choice concerning literature. People who choose depressing authors do so because of their own natures, and such authors seem to them to be more true to life. They are true only to the lives of these particular people. The ones who read the heartening, inspiring, elevating authors are also making a choice in accordance with the dictates of their own lives. "Real life" is a convenient abstraction for concrete application in any way the individual chooses. What is real life for one is visionary and absurd for another.

The principal of a fashionable girls' school jokingly said to me, "It would be possible to make splendid women of most of the pupils if the mothers could be kept away from them. During the early years when the spirit of adventure is developing, girls are devils, but the mothers will not admit the fact, and they object to my premises for repressive measures. Later, at about graduation time, many mothers are vainly ambitious to place their daughters 'upon exhibition,' as you call it. After this, envy and the other disintegrating factors in social life undo much of the structure of character which my teachers and I build up with what we believe to be professional skill."

The teaching of sex questions to classes of children in school is a glimmer of light in the right direction, but it is very crude pedagogy;—the conception is right but morality may fade away under the process. In teaching sex subjects we must remember that knowledge of a subject and morality in relation to it, are not synonymous. That is where educators are still primitive when they wish to take the subject into the school. The teaching of any such subject as that of sex—anything so individual as the demonstration of this primal instinct in each child—is likely to result in laboratory method

like that of the scientist. The child promptly takes new ideas to the laboratory and experiments for the purpose of obtaining object lessons. We may be very sure that some children would do such experimenting, actuated by the same general commendable impulse as that which moves the scientist. During the earlier years of life the child is what the psychiatrists classify as polymorphous perverse, because this feature of its mind,—the sexual feature of its mind,—has to undergo changes like anatomical body changes. As the child grows older, polymorphous features in relation to sex undergo repression to varying degrees, and in order to teach sex subjects to children we must know intimately the character of each child in regard to its conception of sex questions. This is best understood by the mother or by the father who would teach each one of ten children a little differently from the others. Children of different ages (and different children) require different kinds of teaching.

Sex education should take up the subject with a fixed idea of turning the mind away from the subject in general, instead of toward it. Development of character is most important, for character will then take charge of sex questions and all subsidiary and minor subjects. We must always remember that children are phylogenetic barbarians. They have to repeat the steps of social evolution after they are born, in quite as consecutive a way as they repeat the steps of organic evolution before they are born. A sapient mother does not deceive herself with the idea that ready-made angels have been sent to her, even though she has not studied the laws of phylogeny. She obtains practical object lessons of the working of a law which makes her angels start out as barbarians. This does not disconcert a wise mother, if she is prepared to guide the growing minds through various stages of social evolution. The sex part of their teaching should be done by

the mother only, if that is possible. When sex teaching is to be done in a school it is to be done with individual scholars singly, giving no more information than is asked for. Nothing should be volunteered by the teacher. The teacher should not be a specialist in sex subjects, for it would be inconvenient if children were to become experts and specialists in such subjects. They tell us that a little girl's mother was annoyed at learning of a new departure at the school, and said to the daughter: "I hear they are teaching sex questions at your school." To which the daughter replied: "Yes, Mother, is there anything you would like to know?" A wholesome teacher, who has the confidence of the scholars, and not one appointed for the special purpose, is most desirable. There would be danger in appointing teachers who wish to teach such subjects, because this desire is a morbid one on the part of many. They should not be allowed to follow their wishes.

Now, as a matter of fact most children are pretty sensible anyway. Those of us who have had much to do with little street urchins who are supposed to be vicious, know that the mass mind of boys is rather sensible on sex questions. Personally I have not had so much to do with girls, but I am sure they are quite as sensible also in respect to any natural instinct which carries protective impulse along with impulse to action. If sex questions are to be taught in school, and even if they are to be taught by parents or by very carefully selected teachers, the subject may be brought forward most gently by giving in detail the sexual history of plants, particularly flowering plants. The whole question is then brought to esthetic conception in the mind of the child, and that is the nearest the child will get to the spiritual conception of idealists on the subject. Give an esthetic conception of the subject in concrete detail as relating to plants, and the teacher may then pass to the principles as applied to animals very briefly in an

abstract way and with little attention to detail—only a very few general principles being taught. I believe in sex teaching in the city schools if it is done in the right way by the right teachers and very briefly.

Sex teaching cannot safely be given to assembled classes, and not even to individuals by teachers who put on a long face when giving instruction. The jolly teacher with plenty of common sense who gives no more information than is desired, is the one who may be useful in this field. There is a rude code of sex morals pretty well understood by boys among themselves, and I presume the same thing is true among girls, with their added protection of natural modesty. Boys know the neurotic who injures himself by bad habits, and they sneer at him. They may not recognize symptoms of illness on the part of that boy, or know of nature's ways for hurrying elimination of the unfit. In fact they are usually informed wrongly by mentors who state that a nervous or weak-minded boy's habits have brought him to that condition. This is false teaching. The well-informed teacher of good plain sense knows that vicious boys' habits are simply symptoms belonging to the weak mind or neurotic nature. As a matter of fact, healthy boys instinctively know this pretty well. They have their own traditions. To long faced teachers, I would say, "Go home, and leave the boys alone! They are safer with their own traditions than with your teaching." In my hospital experience I was at one time serving in the out-patient department of Chambers Street Hospital long before the days of boys' uplift movements. Hundreds of street arabs came under my care in the course of the year. It was the very worst element in the city of New York, yet I came to have a respect for the general ideas of boys on sex subjects. Even on such questions as the use of rum and tobacco the wild street boys knew a good deal more than they

were given credit for knowing, and among themselves they had simple standards of action worthy of commendation.

In sex education we would also have to assure ourselves that what was taught was not misunderstood. The dormant sexual instinct is very apt to be aroused in susceptible individuals and mental complexes of a sexual character are then formed. Warning is apt not to be taken as such by young people. When the newspapers were filled with accounts of the pitfalls into which young women seeking the stage often fell (in connection with a famous murder trial), stage managers declared they were fairly overwhelmed with the excess of new applicants for stage positions. In Chicago, as a result of stirring up of the social evil question, it was reported that a great influx of applicants for positions in vice resorts was under way. The danger of stirring up dormant sex instinct is observed in the popularity of novels or plays which pander to prurient tastes. The inhibition of sexual ideas, and refinement and control of sex instinct are becoming strongly in evidence with our advancing civilization. The most necessary part of it, refinement and control of laws of self-preservation is becoming more effective and valuable under the rules of advancing civilization. When Krafft-Ebing's "Psychopathia Sexualis" was published some twenty years ago—purporting to be published only for members of the medical profession—it was not read by members of the medical profession so much as by the laity. Whenever my own copy was loaned to a layman who asked for the book it was always difficult to get the book back again, because it had usually gone through the hands of half a dozen sub-loaners. The influence of the book was apparently more destructive than beneficial, because it dealt with the morbid clientele of the psychopathologist's waiting room, and could not even be read by members of the medical profession to much advantage.

Teachers! 'Ware the formation of a sexual mental complex in your pupils! Your intentions are good, but Look Out!

The monistic unity state having the immigration question in America to deal with, would take particular charge of the youths.

Missionaries, night school teachers and settlement workers are doing noble work with immigrant children, but the entire subject should be under the control and direction of the State, for its own profit, directly and indirectly through the development of more useful citizens. The monistic unity state would take nine-tenths of the miserable millions of dollars that are now voted for pensions,—assets of political corruption for destroying self-respect,—and would devote the money to securing teachers, clubs for young people, entertainment, out-of-door recreation, and country homes for this precious mass of youthful immigrant potential. It would all be turned to excellent account for the State.

Kindness and charity toward poor children will be reduced to a science in the monistic unity state. It will be reduced to a science also in relation to the older poor who are able to support themselves if given the right direction. Theoretically every boy and every girl must work out his or her own destiny. This is really true in a way, but if anyone feels that poor children should work out their own destiny in the course of nature's plan let him take part for a very short time in the fresh air excursions for children. The brightening faces and joyous hearts may give him thrills of finer vibration than any which come from other sorts of liberation of his spirit, excepting in the higher realms of science, art and religion.

We have already reached the point of developing movements for the uplift and education of young people on every side,—

boys' associations, boys' clubs, girls' clubs and associations. There are new funds and endowments devoted to the interest of young human welfare. We hear much at the present time of boys' camps, where in former years we heard more of the same combination of letters with the apostrophe left out and the "s" moved up a space. There are groups of Camp Fire Girls,—a special new movement for oxidizing toxins and collecting a lucid lot of healthy normal protoplasm for entailment to progeny, along with old silver services and rare china. This growing sign of the times gives "outlook."

Another one of the hopeful signs of progress of man toward a higher plane is a constant movement in the direction of lessening cruelty toward dumb animals.

One's heart will bleed if he observes the sufferings of the poor in the course of his mission work. One's soul will have an uplift if he studies the diatoms of mud from the bottom of a pond. Both of these points of view however,—social and biologic,—are microscopic views. They are microscopic views of suffering and of beauty at close range.

This might be called mental orthophoria. Orthophoria does not see comprehensively however unless we begin with the microscope in order to obtain first lessons for purposes of making larger comparison later. Lacking for such comparison, one does not think of the entire subjects of suffering and of beauty any oftener than people who live in a land of perpetual summer think about winter. Passing from microscopic views up to orthophoric views, and then on to telescopic views, we observe much "suffering" among the heavenly bodies which are struggling to retain their identity. We see as much beauty in spectroscopic examination of light from a planet as a man with normal orthophoria sees in flowers or as a man with the microscope sees in diatoms. All existence of matter

then is magnificent in its beauties and in its struggles. Who would wish to miss his turn for a part in the grand game?

Higher up in the social scale among men we observe just as much suffering as among the lowly, without requiring a microscope for the view. Higher above diatoms in the biologic scale we find just as much beauty,—among the flowers.

The idea that the poor and the ill should work out their own destiny unaided along lines of evolution and natural selection, is really nature's plan if we choose to look at the subject in a microscopic way. In a large way of looking at the subject,—the state caring for its poor and protecting itself against the unfit, belongs quite as much to an evolution plan in nature. It is based upon the monistic unity idea of conservation evolution,—a function belonging to the responsibility which has been placed upon man by nature.

Put your hand under the slums of New York and lift a thousand "unfit" children into the sunlight for a moment. See their shells burst and their minds expand, and you will then enter upon a new phase of imagery, and will realize the enormous store of energy that is kept in reserve by nature and wasted at present as part of nature's plan of lavish waste. Man like the oak tree utilizes waste material as fast as he grows large enough to reach out to it with his roots.

Juvenile delinquents for the most part are not responsible, as they present merely decadent traits or untrained good qualities. They are weeds which might develop into beautiful and useful plants under the environment which is given their more fortunate neighbors. One definition of weed is "a plant for which use has not yet been found." I never look at a group of newsboys without thinking how potent they are for good if they could but have the opportunities of boys living on the next avenue, with high-class teachers. One who

believes in boys gets to be very fond of these little ragamuffins, and they quickly respond.

Many of the young delinquents are hereditary asthenics, and it is not their fault.

We cannot make a plant grow, we can only furnish conditions for growth. We cannot make a man a criminal or saint, we can only furnish the conditions for allowing him to become a criminal or a saint. He will then do things in his own way, according to his limitations under the conditions which we furnish. The responsibility is ours,—society's.

An illustration of the influence of environment. There was in my vicinity in the country a man who was usually half drunk, and generally considered to be worthless. He abused his family, left them without means, and his wife had to take in washing in order to feed the children. He had been in jail. He was taken into employment by a man who could not get any one else at the time because of lack of farm labor. My neighbor who took him into employment was by nature kind, considerate, diplomatic and uncritical. The erstwhile worthless employee stopped drinking abruptly although he was not obliged to stop at all. He became interested in the work of his employer and respected by all the neighborhood. He took good care of his family, became a responsible manager of the farm, and in fact a man who had changed to become his better self. There was no religious influence or any other special influence brought to bear, excepting the example of a fine character in his employer. This employee was free to do as he pleased, but simply from observing a good citizen with whom he was brought into contact he chose the right way. It was "in him" to do this but no one had previously furnished environment which brought out his excellent traits of character.

I have watched a moner making forward movements on the slide under the microscope, and apparently progressing when as a matter of fact it was going backward all the time, because there was a downward imperceptible current on the slide. The moner's movements were apparently forward, and it instinctively felt they were forward, but it was caught in the "custom" of the water on that slide. I had to help it up by changing the custom of the water.

In the monistic unity state by changing the environment of a plant or animal wisely, and in knowledge of the microbe clause in any contract, we shall advance such good characteristics as we wish to preserve, and eliminate undesirable characteristics. This cannot be done independently of an understanding with king microbe, otherwise he will tear down all of our good work, and make us go all over the ground again wastefully. Fluctuating variations due to environment in plants and in animals seem not to be inherited. Inherited variations are apparently due to structural changes in germ cells, depending upon environment for the character of their development, but not for their transmission so far as some of us believe at present.

Dr. Havelock Ellis has described a German family, beginning with two parents from whom 834 persons were known to be descendants, most of whom were physically strong but mentally weak. A very large majority of these were prostitutes, drunkards, tramps, paupers and criminals, and the German government was put to a great expense, estimated at more than 125,000,000 marks, in looking after them. Such a history is due not only to transmission of physical and mental characteristics, but also to the environment into which a group has happened to slide along lines of social cleavage. If we take the descendants of Jonathan Edwards, for instance, we find no record of criminals and most of them occupied posi-

tions of trust and honor. Among 1394 recorded descendants of Jonathan Edwards we find one vice-president, eight United States senators, twelve college presidents, sixty-five college professors, sixty physicians, one hundred clergymen, seventy-five army and navy officers, sixty prominent authors, one hundred lawyers, thirty judges and eighty public office holders. Some of the descendants of Jonathan Edwards are among my nearest and dearest friends, and I know they would not agree to the idea that feeble-mindedness has never appeared among any members of the family, or that ill members have never committed crime.

Aside from the strong primary influence bearing upon the progenies in the German family or in the Jonathan Edwards family, we have the influence of environment. Perhaps the German family starting out with the surroundings of the Edwards family but followed by planned environment would have made nearly as good a showing in the end, and the Edwards family among the persistent surroundings of the German family might have gone downward.

I doubt if the statistics relating to either one of these families are pristine in purity of whole fact. Experience leads me to feel that a careful search may have unearthed more good citizens in the one case and more criminals in the other case. However that may be, the relative proportion of good citizens and of criminals in the two groups of statistics furnish food not only for thought but for to-morrow's action. We may take a trailing blackberry and by selection make the species erect in habit, in the garden. By selection we may from the erect blackberries choose individual plants which lean more and more, and finally establish in the garden a variety of trailing blackberry from a naturally erect species. It is largely therefore the fault of association if any one family goes wrong for a long time. When the time comes in nature's plans for

selecting and directing the trailing vines in families they can be made to become erect.

In the days when my barbarous Puritan ancestors were disturbed by witches, disease was ascribed to the wrath of God rather than to hungry microbes. Even up to a very recent day we have generally treated the criminal as a man with a weak will. We have treated the periodic drinker of alcohol as a man with weak will, when as a matter of fact, he was to be looked upon as an invalid. It has been the power of illness rather than weakness of the will in his case.

What is a criminal? Where is the criminal class? The criminal is only the one who has been "caught at it," according to police records, and what we call the criminal class is found in high circles as well as in low. There is no criminal class. Any one who speaks of such a class has in mind some vaguely pictured group which happens to live out of his own house. He cannot state exactly where the criminal class lives.

The prison association statistics show a large proportion of captured individuals with physical defects, and yet the proportion is perhaps not much larger than would be found among uncaptured citizens. The point to be made is that training was lacking in the criminals who were captured and measured. Poverty is largely a factor in giving direction, and poverty together with illness that goes with physical defects may give us the criminal who goes to prison. That identical individual under better environment might have become a famous artist, author, or perhaps more like a capitalist.

Changing the character of criminals through training of their brain cells is not different from daily practical experience with all motor occupations. When any particular set of brain cells is exercised regularly, development occurs like that of

muscle cells of the biceps of an athlete. Whatever occupies a man's mind will grow daily as thought habit, in the same way as the biceps muscle develops and for the same reason.

The prison reform movement of the monistic unity state will note that most crimes are committed as a result of some physical incompetence, with its corresponding mental exhibition. Treatment of crime will include the idea of removal of all precipitating causes for the mental exhibition. For instance, Dr. Chase of the Elmira Reformatory, reports that half of the boys under his care have such abnormal eyes that it is difficult for them to do any work requiring close eye concentration. Dr. Orton of Rahway Reformatory makes the same sort of report. Now stop for a moment and think about these reports from such responsible authorities as Dr. Chase and Dr. Orton. The irritability caused by eye defects alone in their reflex consequences will lead to much crime, and the secondary toxic irritation when eye-strain causes functional derangement of organs supplied by the splanchnic nerve leads to more crime. Yet the eye difficulty forms only one kind of recognizable defect among criminals.

In the monistic unity state there will still be punishment, but thoughtfully directed. It will not mean savage exposure of one individual to the consequences of irritation of another individual, under license by the state. The state is the primary malefactor. When a child was called by its mother "a little pig" the child asked, "Say! What do they call the mother of a little pig?" That is the relation between state and criminal. I had thought to leave all punishment out of the monistic unity state, but really the children must be spanked a little and wisely at the psychological moment, because they actually are phylogenetic barbarians. Then I tried to have all punishment cease after the fifteenth year of age of an individual, but some

large old Italians got into my melon patch one night and left the question open when they departed. However, I think we may leave the question to become one of self-protection. Punishment should not appear in the attitude of the state toward adult criminals. Self-protection is the mental attitude which the state must assume in as kindly a way as possible toward people who are injurious to the state in a criminal way. The jail and the reformatory are finishing schools for criminals.

When intelligence and opportunity lead to decomposition of character in the higher walks of life, it represents the limit of development of fruit belonging to that nation. If the best fruit of any given nation shows corrupt higher officials, it means that another nation is to displace it, for we assume, judging from experience, that nature wishes to have right prevail. Other nations want the land that raises rotting fruit. Nature will eventually give it to succeeding nations who can raise better things.

A certain profligate has had endless legal processes invoked for saving his life after he had murdered a valuable citizen. An Italian formerly in my employ killed a man. He was subjected to only one legal process and was sentenced to prison for life, having no money sufficient for employing legal talent. The testimony in the profligate's case indicated that the law was preserving a citizen who always had been worthless, but my Italian I personally knew to have been a good husband, a good father, orderly in all ordinary affairs, and a persistently useful citizen. It was in a moment of exasperation that he lost control and shot a man who was of small account. Society nevertheless has protected itself as well as present methods allow, against the lucky profligate and the luckless Italian.

Next to kings and presidents, conscientious judges are objects for pity and commiseration, under the methods of our

present civilization. In the monistic unity state the judges will appoint certain experts to testify in all criminal cases. The first expert will present facts relating to heredity and to stigmata of decadence of a prisoner. The next expert will present a laboratory report upon bacterial findings. A physiologist will then be called. The last expert will be a psychologist who will report upon what might be expected of the prisoner upon a basis of findings of the three former experts. Now, so far as the practical working of such a system would go, the profligate whose case I have quoted would be incarcerated permanently as a vicious character,—likely to repeat murder. My Italian would also be incarcerated permanently, even with his history of previous good citizenship, because he might repeat murder under a sufficient degree of provocation. Our satisfaction would rest in a saving of expense to the state and in having a clear understanding of the real nature of both cases.

In Georgia there is a state farm operated in connection with the State Penitentiary as an agricultural experiment station. This presents an educational feature not only to the criminals, but to all of the farmers of the state as well. Georgia also operates another farm in connection with its state sanitarium. The latter is known as the Colony Plantation, and it is worked by two hundred people, who do better under open air treatment for various illnesses. There are many of the feeble-minded and harmless dements at this sanitarium. The actual profits to the state of Georgia from the farm connected with this sanitarium for the year of 1912 amounted to more than ten thousand dollars, in addition to payment for the running expenses of the colony. If the state of Georgia can make ten thousand dollars a year net profit from a farm colony that is worked by the ill and the demented, every state in the Union can afford on a financial basis alone, if for no other reason, to

give similar opportunity to the stronger and more intelligent unemployed.

The state has not as yet seen fit to establish an agricultural bank for the purpose of helping good citizens to help themselves. It has freely licensed fraudulent land schemers to take the little insurance money left to a widow, who was attracted by newspaper advertisements. When the money was gone the state has cared for her son without expense to the family when he stole a loaf of bread. It has cared for her daughter at a free hospital, after the harpies of the streets had picked her bones. To this extent the state has been willing to be kind, but the idea of making useful and valuable citizens of that family through the help of an agricultural bank has not been in accord with established banking methods, and we are all shy of anything that has not already become established.

The monistic unity state will have a national agricultural bank which makes no profit beyond paying expenses. Willing workers who are out of work, the bookkeeper in failing health, the clerk who is getting a little too far along in years, the displaced teacher, the man who is thrown out of occupation because machinery has taken charge of his specialty, in fact, the great mass of willing unemployed who are often extremely competent for many accomplishments may borrow money from the bank. They may borrow without security, excepting as the land which is purchased becomes security. Food supplies, utensils, and clothing may be obtained on credit, within reasonable limits set by the directors of the bank. Men of valuable general experience and with a good store of knowledge, but who are out of position because of circumstances, will be often willing to conform to the methods of this financial institution. On the money borrowed from the bank they are to pay interest and charges sufficient for maintaining

the bank, as soon as they are enabled to do so, but there will be no profit made by the bank beyond enough to make sure of covering all costs to the state. Borrowers will have to follow certain directions in relation to the raising of crops for immediate returns. A certain degree of freedom will be allowed in the choice of tree crops, or experimental crops, because those will be the fields in which individualism can best express itself. The bank will not need to interfere much with talent and imagination, but will simply demand on the basis of its experience that certain crops must be raised every year in order to assure the income. This matter will be in charge of a special committee of the bank. The land can be gradually paid for by the borrower, so that it becomes his own eventually. In the case of death of an owner the state loses nothing, because the land is re-sold to another individual.

Aside from the income from its acres, the land itself will be increasing steadily in value. If the economists are agreed upon any one thing they are agreed that the value of land depends upon the density of population. As a general proposition, buy the land, say nothing to discourage other people from increasing the population, and the property increment is yours. The possession of unearned increment is one of the chief joys of life. It is like picking up things. There is no space in these notes for the details of plans which I worked out theoretically, but they seem to place the idea within reach of practical adjustment.

The thought of this kind of scheme came while riding past a country poor-house in the western part of New York with a friend. He informed me that the place had not only paid all of its running expenses, but had made income enough to pay all other charges and to show a profit. The superintendent was continually begging to have more paupers sent to him. The system at this place included the raising of small fruits,

of large fruits, and of staple crops. If this could be done through the labor of the unfortunate people who get to a country poor-house it seemed to me that a very much higher class of unemployed who are still vigorous, proud and with trained intelligence, might be supplied by the state with opportunity for doing better yet. By the unemployed I mean in this particular connection the ones who really have the will to work, and who have proven it in former occupation. The manor house furnished by the bank would form a social centre, satisfactory for social needs. Some of the land owners would develop skill and method in their new work which would insure large returns, because unsuspected talent in horticulture would be certain to appear. These special returns would belong to the land owner. There are many men who have never found their true position until they were thrown out of employment, and later found that it was the luck of their lives. A community plan for the willing unemployed would avoid that rusting depression that goes with too much rest. It would keep valuable minds bright and alert, and of value to both the individual and to the state. There would be opportunity not only for profit but for advancing talent, as in other corporations. Corporations with legitimate selfish interests naturally wish to make and retain all profits, but in this case profits over expenses would belong to individuals. The state often forgets that it is likewise a corporation, with profits to be gained from the labor of almost every man who is anywhere employed within the state.

The farm colony supported by an agricultural state bank might care for impecunious people who are quite as worthy as others who enjoy a competence. Think of all the authors and artists who would be free to think out their best thoughts. Consider for instance a woman suddenly left penniless and a widow, with children. Living expenses would be assured in

the farm colony,—and consider the healthful occupation for children in addition. To be sure, typhoid fever, faddists, and hail storms will disturb the farm colonists from time to time, and seldom less than three dissatisfied people would exert continued influence. There will consequently be no Utopia in the scheme, but it will at least constitute a step forward in furnishing joy for folks. My idea is schematic, and might not prove to be the least bit practical when one came to actually deal with the human nature side of the question. People might think such a plan too original and would prefer to starve. The apparent longing to do something original which is expressed by almost everybody represents nothing more than an instinctive desire toward mutation. This is demonstrated in all forms of organic life in various degrees. The highest animal is in a state of unrest because of the influence of this natural instinct, but he does not recognize its primal origin or biologic significance. He talks about doing original things but does not often plan systematically for becoming a useful variant. Haphazard variants are occurring constantly. They belong to the ordinary wild growth of our cultural periods. At one of our sea-side fair grounds which is devoted to annual social exhibition, a young man and woman fashionably dressed were seized with an impulse to wade through the basin of a fountain in the presence of a number of people. Such an original act at once gave them great social prestige, and they became favorites. This act, judged from its biologic basis meant a crude display of the primitive instinct toward variation and indicates the paucity of our present resources in giving opportunity for useful mutation. A monkey dinner at this same fair ground attracted much attention at one time. As we progress in culture the instinct towards variation will be turned into useful channels. At the present time, even under conditions of our still primitive culture, the variation instinct

perhaps runs in useful channels more often than in sensational showy channels on the whole; but this is a matter of accident, not of plan. In the monistic unity state mutation instinct will be taken in charge as a great power. It will be utilized in its various bearings. Its presence is not even recognized as yet, so far as I know. People who might think of doing anything so original as supporting themselves in a farm colony would hesitate long perhaps before leaving the flock of town sheep. We all bleat about doing original things, because that represents primal mutation instinct. We are very careful not to do original things, because such action brings mutation instinct into conflict with gregarious instinct at various points of its action. In the twentieth century new adjustments are to be made between mutation instinct and gregarious instinct.

When this idea of a farm colony first came to mind I put it to several men, all of whom were really competent and valuable for important work, but unemployed nevertheless. When I asked them if they would take land under these circumstances, some of the men said they would have to think it over for some time! Others answered in slang, "You bet!" and one young woman teacher, whom I supposed to be chiefly interested in her present good work, happening to overhear part of the idea, eagerly grasped my arm and said, "Oh, is there such a bank? Tell me about it!" She had always wanted to raise flowers for the market. Another young woman of salaried position with whom I was discussing the question said that she would rather live on the farm at one dollar a day, doing everything out of her own head, than to work for four times that amount for someone else as she was then doing. "Ah, yes," I replied, "you are one of the independent young women of the present day spirit." "No, indeed," said she, "I want to be dependent, but upon a strong, fine man who could also live upon a dollar a day if necessary."

In the city one longs to escape to the country,—in the country the desire is cityward. These are such fundamental desires that no doubt nature will arrange finally for us to gratify the longing. We already have the community system in many foreign villages, houses aggregated, and farms extending like spokes of a wheel from its hub. This is the primary form of what may be developed later as a principle for application to large aggregations of people. Much depends upon the transportation question, and advances will be made in this to meet our needs.

According to statistics, cities will be dominating the politics and practically all affairs of the states one hundred years from now in America, if the present rate of increase is maintained in the cities. No great change from this prospect is in view. It may come through some widespread movement back toward the land and toward health, aided by the flying machine.

The question why country children are not always stronger than city children is answered in part, if you see as I recently have, a farmer's child less than two years of age making a meal of green apples and coffee. One need not infer that all children in the country are brought up on green apples and coffee, and city children on infected milk, but bad hygiene and food in the country suffices to counterbalance some of the effects of good air and fresh food.

When a farmer working all day in the open air gets a magnificent cellular activity under way, and then sleeps in a room with closed windows at night, he has an excess of waste material which is not disposed of, through the mere fact of his having excited so much cellular activity. If his wife works in the hot kitchen all day and does not go out to look about the out-buildings for chickens' eggs for two or three days at a time on account of the weather, she in turn allows bacteria to oversensitize her protoplasm. In that family we may find

decadent children, mental derangement and general ill health among people who live where conditions are naturally of the best for promoting health. The conditions are of the best, but are not appreciated nor utilized.

In our monistic unity state the students of history will be taught that up to the early part of the twentieth century, science as relating to man's mind had only progressed so far as to make classifications from mental expression (corresponding to fruit), rather than from soma cell and sex cell characteristics (corresponding to stigma, petals, etc. of plants). The abnormal sports of these cells under microbic influence (corresponding to double rose, seedless apple) were classed as genius. Further, it was a cause for wonder among these simple people of the early twentieth century that characteristics like supreme genius and supreme doubling of the flower did not perpetuate themselves in progeny. They could not see, even with the object lesson of the valuable seedless apple and Ruskin mind, that nature was calling a halt, putting the brakes on too rapid progress toward ideal types in fruit and its parallel—mind.

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